Ordinance Adopting Seattle Amendments to the 2003 International Mechanical Code

effective August 15, 2004

NOTE: This document is **not** designed for insertion into the IMC. The Department of Planning and Development hopes to make the amendments available by the end of August from the Public Resources Center, 20th floor of Seattle Municipal Tower, 700 Fifth Ave., (206) 684-8467.

City of Seattle
Department of Planning and Development
www.seattle.gov/dpd/techcodes

Maureen Traxler/ma
IMC Ordinance
date 4/26/2004
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ORDINANCE _____

AN ORDINANCE relating to Building and Construction Codes: amending Chapter 22.400 of the Seattle Municipal Code, the Seattle Mechanical Code; adopting Chapters 2 through 9, Chapter 11, and Chapters 13 through 15 of the 2003 International Mechanical Code; amending Chapter 2, Definitions; Chapter 3, General Regulations; Chapter 4, Ventilation; Chapter 5, Exhaust Systems; Chapter 6, Duct Systems; Chapter 8, Chimneys and Vents; Chapter 9, Specific Appliances, Fireplaces and Solid Fuel Burning Equipment; Chapter 11, Refrigeration; and Chapter 15, Referenced Standards; adding a new Chapter 1 related to administration, permitting and enforcement; and repealing the 1997 Seattle Mechanical Code.

BE IT ORDAINED BY THE CITY OF SEATTLE AS FOLLOWS:

Section 1. Section 22.400.010 of the Seattle Municipal Code is amended as follows:

SMC 22.400.010 Adoption of ((~~Uniform~~)) International Mechanical Code. The Seattle Mechanical Code shall consist of the following portions of the ((~~1997~~)) 2003 edition of the ((~~Uniform~~)) International Mechanical Code as published by the International ((~~Conference of Building Officials~~)) Code Council, together with the amendments and additions thereto adopted: Chapters 2 through 9, Chapters 11, and Chapters 13 through 15 ((~~and 16 and the Uniform Mechanical Code standards contained in Appendix A~~)). One copy of the ((~~1997 Uniform~~)) 2003 International Mechanical Code is filed with the City Clerk in C. F. ((~~302708~~)) _____.

Section 2. The 1997 Seattle Mechanical Code adopted by Ordinance 119080 and amended by Ordinance 120380 is hereby repealed.

Section 3. Chapter 1 of the Seattle Mechanical Code is adopted to read as follows:

CHAPTER 1

ADMINISTRATION

SECTION 101

TITLE

These regulations shall be known as the "Seattle Mechanical Code," may be cited as such, and will be referred to herein as "this code." All references to the *International Mechanical Code* contained in this code shall mean the *Seattle Mechanical Code*.

SECTION 102

PURPOSE

The purpose of this code is to provide minimum standards to safeguard life or limb, health, property and public welfare by regulating and controlling the design, construction, installation, quality of materials, location, operation, and maintenance or use of heating, ventilating, cooling, refrigeration systems, incinerators and other miscellaneous heat–producing appliances within the City.

The purpose of this code is to provide for and promote the health, safety and welfare of the general public, and not to create or otherwise establish or designate any particular class or group of persons who will or should be especially protected or benefited by the terms of this code.

SECTION

103 SCOPE

103.1 Applicability. The provisions of this code shall apply to the erection, installation, alteration, repair, relocation, replacement, addition to, use or maintenance of any heating,

ventilating, cooling, refrigeration systems, incinerators or other miscellaneous heat–producing appliances within the City. The design and testing of equipment regulated by this code shall be subject to the approval of the code official.

Exceptions:

1. Detached one- and two-family dwellings and multiple single-family dwellings (town houses) not more than three stories above grade plane in height with a separate means of egress and their accessory structures shall comply with the *International Residential Code*.

2. The standards for liquefied petroleum gas installations shall be the 2001 edition of NFPA 58 (Liquefied Petroleum Gas Code) as amended and the 2002 edition of ANSI Z223.1/NFPA 54 (National Fuel Gas Code).

103.2 Alterations. Additions, alterations, repairs and replacement of equipment or systems shall comply with the provisions for new equipment and systems except as otherwise provided in Section 104 of this code.

103.3 Most Restrictive. Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable.

W] 103.4 Conflict with Ventilation Code. In the case of conflict between the ventilation requirements of this code and the ventilation requirements of Washington Administrative Code Chapter 51-13 the Washington State Ventilation and Indoor Air Quality Code (VIAQ), the provisions of the VIAQ shall govern.

103.5 Referenced codes and standards. The codes and standards referenced in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference. Where differences occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

Exception: Where enforcement of a code provision would violate the conditions of the listing of the equipment or appliance, the conditions of the listing and manufacturer's instructions shall apply.

103.6 Appendices. Provisions in the appendices shall not apply unless specifically referenced in the adopting ordinance.

103.7 Metric units. Wherever in this ordinance there is a conflict between metric units of measurement and English units, the English units shall govern.

SECTION 104

APPLICATION TO EXISTING MECHANICAL SYSTEMS

104.1 Additions, Alterations or Repairs. Additions, alterations, renovations or repairs may be made to any mechanical system without requiring the existing mechanical system to comply

with all the requirements of this code, provided the addition, alteration, renovation or repair conforms to that required for a new mechanical system. Additions, alterations, renovations or repairs shall not cause an existing system to become unsafe, unhealthy or overloaded.

Minor additions, alterations, renovations, and repairs to existing mechanical systems may be installed in accordance with the law in effect at the time the original installation was made, when approved by the code official.

104.2 Existing Installations. Mechanical systems lawfully in existence at the time of the adoption of this code may have their use, maintenance or repair, conversion of fuel, or component replacement continued if the use, maintenance, repair, conversion of fuel, or component replacement is in accordance with the basic original design and location, and no hazard to life, health or property has been created by such mechanical system.

104.3 Changes in Building Occupancy. Mechanical systems which are a part of any building or structure undergoing a change in use or occupancy, as defined in the Building Code, shall comply with all requirements of this code which may be applicable to the new use or occupancy.

104.4 Maintenance. All mechanical systems, materials and appurtenances, both existing and new, and all parts thereof shall be maintained in proper operating condition in accordance with the original design and in a safe and hazard–free condition. All devices or safeguards which are required by this code shall be maintained in conformance with the code edition under which installed. The owner or the owner's designated agent shall be responsible for maintenance of mechanical systems and equipment. To determine compliance with this subsection, the code official may cause a mechanical system or equipment to be reinspected.

The Fire Chief and the code official shall each have authority to obtain compliance with the requirements of this subsection.

Exception: The code official may modify the requirements of this section where all or a portion of the building is unoccupied.

104.5 Moved Buildings. Building or structures moved into or within the City shall comply with standards adopted by the code official. No building shall be moved into or within the City unless, prior to moving, the code official has inspected the building for compliance with this code and the permit holder has agreed to correct all deficiencies found and has been issued a building permit for the work. A bond or cash deposit in an amount sufficient to abate or demolish the building shall be posted prior to issuance of a permit. See Section 116 for information required on plans. Any moved building that is not in complete compliance with standards for moved buildings within eighteen months from the date of permit issuance and is found to be a public nuisance may be abated.

104.6 Historic Buildings and Structures. The code official may modify the specific requirements of this code as it applies to buildings and structures designated as landmarks of historical or cultural importance and require in lieu thereof alternate requirements which, in the opinion of the code official, will result in a reasonable degree of safety to the public and the occupants of those buildings.

A historic building or structure is one which has been designated for preservation by the City Landmarks Preservation Board or the State of Washington, has been listed, or has been

determined eligible to be listed, in the National Register of Historic Places, has been officially nominated for such status, or is a structure contributing to the character of a designated landmark or special review district.

SECTION 105
ALTERNATE MATERIALS AND METHODS OF CONSTRUCTION

This code does not prevent the use of any material, design or method of construction not specifically allowed or prohibited by this code, provided the alternate has been approved and its use authorized by the code official.

The code official may approve an alternate, provided he/she finds that the proposed alternate complies with the provisions of this code and that the alternate, when considered together with other safety features of the building or other relevant circumstances, will provide at least an equivalent level of strength, effectiveness, fire resistance, durability, safety and sanitation.

The code official may require that sufficient evidence or proof be submitted to reasonably substantiate any claims regarding the use or suitability of the alternate. The code official may, but is not required to, record the approval of modifications and any relevant information in the files of the code official or on the approved permit plans.

SECTION 106
MODIFICATIONS

The code official may approve modifications for individual cases, provided the code official finds: (1) there are practical difficulties involved in carrying out the provisions of this code; (2) the modification is in conformity with the intent and purpose of this code; and (3) the modification will provide a reasonable level of fire protection and structural integrity when considered together with other safety features of the building or other relevant circumstances. The code official may, but is not required to, record the approval of modifications and any relevant information in the files of the code official or on the approved permit plans.

SECTION 107

TESTS

Whenever there is insufficient evidence of compliance with the provisions of this code, or evidence that any material or method of construction does not conform to the requirements of this code, the code official may require tests as proof of compliance to be made at no expense to the City.

Test methods shall be as specified in this code or by other recognized test standards. If there are no recognized and accepted test methods for the proposed alternate, the code official shall determine the test procedures.

All tests shall be made by an approved agency. Reports of such tests shall be retained by the code official.

SECTION 108

JURISDICTION AND POWERS AND DUTIES OF CODE OFFICIAL

108.1 Jurisdiction. The Department of Planning and Development is the code enforcement agency in the City of Seattle for this code. The Director of the Department of Planning and Development is the code official.

108.2. General. The code official is authorized and directed to enforce this code, except that enforcement authority as provided in this code to the code official is also vested in the Director of Public Health and the Fire Chief. Compliance with the requirements of this code is the obligation of the owner of the building, structure or premises, the duly authorized agent of the owner, or other person responsible for the condition or work, and not of the City or any of its officers or employees.

108.3 Deputies. The code official may appoint such officers and inspectors and other employees as shall be authorized from time to time. The code official may deputize such inspectors or employees as may be necessary to carry out the functions of the code official.

108.4 Right of Entry. With the consent of the owner or occupier of a building or premises, or pursuant to a lawfully issued warrant, the code official may enter a building or premises at any reasonable time to perform the duties imposed by this code.

108.5 Stop Orders. Whenever any work is being done contrary to the provisions of this code, or in the event of dangerous or unsafe conditions related to construction or demolition, the code official may order the affected work stopped by a notice describing the violation in writing, posted on the premises or served on any person responsible for the condition or work. It is

unlawful for any person to engage in or to cause such work to be done until authorization from the code official is received.

108.6 Authority to Disconnect Utilities in Emergencies. The code official has the authority to disconnect fuel–gas utility service or energy supplies to a building, structure, premises or equipment regulated by this code in case of emergency where necessary to eliminate an immediate hazard to life or property. The code official may enter any building or premises to disconnect utility service. The code official shall, whenever possible, notify the serving utility, the owner and occupant of the building, structure or premises of the decision to disconnect prior to taking such action, and shall notify such serving utility, owner and occupant of the building, structure or premises in writing of such disconnection immediately thereafter.

108.7 Authority to Condemn Equipment. Whenever the code official ascertains that any equipment, or portion thereof, regulated by this code has become hazardous to life, health or property, the code official shall order in writing that such equipment may either be disconnected, removed or restored to a safe or sanitary condition, as appropriate. The written notice itself shall fix a time limit for compliance with such order. It is unlawful for any person to use or maintain defective equipment after receiving such notice.

When such equipment or installation is to be disconnected, the code official shall give written notice of such disconnection and causes therefore shall be given within 24 hours to the serving utility, the owner and occupant of the building, structure or premises. When any equipment is maintained in violation of this code, and in violation of a notice issued pursuant to the provisions of this section, the code official shall institute any appropriate action to prevent, restrain, correct or abate the violation.

108.8 Connection after Order to Disconnect. No person shall make connections from any energy, fuel or power supply nor supply energy or fuel to any equipment regulated by this code which has been disconnected or ordered to be disconnected by the code official, or the use of which has been ordered to be discontinued by the code official until the code official authorizes the reconnection and use of such equipment.

108.9 Liability. Nothing contained in this code is intended to be nor shall be construed to create or form the basis for any liability on the part of the City, or its officers, employees or agents, for any injury or damage resulting from the failure of equipment to conform to the provisions of this code, or by reason or in consequence of any inspection, notice, order, certificate, permission or approval authorized or issued or done in connection with the implementation or enforcement of this code, or by reason of any action or inaction on the part of the City related in any manner to the enforcement of this code by its officers, employees or agents.

This code shall not be construed to relieve from or lessen the responsibility of any person owning, operating or controlling any building or structure for any damages to persons or property caused by defects, nor shall the Department of Planning and Development or the City of Seattle be held as assuming any such liability by reason of the inspections authorized by this code or any permits or certificates issued under this code.

108.10 Cooperation of Other Officials and Officers. The code official may request, and shall receive so far as is required in the discharge of the code official's duties, the assistance and cooperation of other officials of the City of Seattle.

SECTION 109

UNSAFE EQUIPMENT AND HAZARD CORRECTION ORDER

109.1 Unsafe Equipment. Any equipment regulated by this code that constitutes a fire or health hazard or is otherwise dangerous to human life is, for the purpose of this section, unsafe. Any use of equipment regulated by this code constituting a hazard to safety, health or public welfare by reason of inadequate maintenance, dilapidation, obsolescence, fire hazard, disaster, damage or abandonment is, for the purpose of this section, an unsafe use. Any such unsafe equipment is hereby declared to be a public nuisance and may be abated.

109.2 Hazard Correction Order. Whenever the code official finds that unsafe equipment exists, the code official may issue a hazard correction order specifying the conditions causing the equipment to be unsafe and directing the owner or other person responsible for the unsafe equipment to correct the condition. In lieu of correction, the owner may submit a report or analysis to the code official analyzing said conditions and establishing that the equipment is, in fact, safe. The code official may require that the report or analysis be prepared by a licensed engineer. It is unlawful for any person to fail to comply with a hazard correction order as specified in this subsection.

SECTION 110

APPEALS

Appeals from decisions or actions pertaining to the administration and enforcement of this code shall be addressed to the code official. The appellant may request a review by three or more members of the Construction Codes Advisory Board, convened by the Chair. The issue of the

appeal shall be taken into account by the Chair when selecting members to hear an appeal. The results of this appeal shall be advisory only.

SECTION 111

VIOLATIONS AND PENALTIES

111.1 Violations. It is a violation of this code for any person, firm or corporation to install, erect, construct, enlarge, alter, repair, replace, remodel, move, improve, remove, convert or demolish, equip, occupy, use or maintain any mechanical systems or equipment or cause or permit the same to be done in the City, contrary to or in violation of any of the provisions of this code.

It is a violation of this code for any person, firm or corporation to use any material or to install any device, appliance or equipment which does not comply with the applicable standards of this code or which has not been approved by the code official.

111.2 Notice of Violation. If, after investigation, the code official determines that standards or requirements of this code have been violated, the code official may serve a notice of violation upon the owner or other person responsible for the action or condition. The notice of violation shall state the standards or requirements violated, shall state what corrective action, if any, is necessary to comply with the standards or requirements, and shall set a reasonable time for compliance. The notice shall be served upon the owner or other responsible person by personal service, registered mail or certified mail with return receipt requested, addressed to the last known address of such person. In addition, a copy of the notice may be posted at a conspicuous place on the property. The notice of violation shall be considered an order of the code official.

Nothing in this subsection shall be deemed to limit or preclude any action or proceeding pursuant to Sections 108 or 109 of this code, and nothing in this section shall be deemed to obligate or require the code official to issue a notice of violation prior to the imposition of civil or criminal penalties in this section.

111.3 Civil Penalties. Any person, firm or corporation failing to comply with the provisions of this code shall be subject to a cumulative civil penalty in an amount not to exceed $500 per day for each violation from the date the violation occurs or begins until compliance is achieved. In cases where the code official has issued a notice of violation, the violation will be deemed to begin, for purposes of determining the number of days of violation, on the date compliance is required by the notice of violation.

111.4 Criminal Penalty. Anyone who violates or fails to comply with any order issued by the code official pursuant to this code or who removes, mutilates, destroys or conceals a notice issued or posted by the code official shall, upon conviction thereof, be punished by a fine of not more than $1,000 or by imprisonment for not more than 360 days, or by both such fines and imprisonment. Each day's violation or failure to comply shall constitute a separate offense.

Anyone violating or failing to comply with any of the provisions of this code and who within the past five years has a judgment against them pursuant to Section 111.3, shall upon conviction thereof, be punished by a fine in a sum not to exceed $500 or imprisonment for not more than 180 days, or by both such fine and imprisonment. Each day's violation or failure to comply shall constitute a separate offense.

111.5 Additional Relief. The code official may seek legal or equitable relief to enjoin any acts or practices and abate any condition which constitutes a violation of this code when civil or criminal penalties are inadequate to effect compliance.

SECTION 112
NOTICES

It is unlawful for any person to remove, mutilate, destroy or conceal any notice issued or posted by the code official pursuant to the provisions of this code or any notice issued or posted by the code official in response to a natural disaster or other emergency.

The code official may record a copy of any order or notice with the Department of Records and Elections of King County.

The code official may record with the Department of Records and Elections of King County a notification that a permit has expired without a final inspection after reasonable efforts have been made to provide a final inspection.

SECTION 113
RULES OF THE CODE OFFICIAL

113.1 Authority. The code official has the power to render interpretations of this code and to adopt and enforce rules and regulations supplemental to this code as may be deemed necessary in order to clarify the application of the provisions of this code. Such interpretations, rules and

regulations shall be in conformity with the intent and purpose of this code. The code official is authorized to promulgate, adopt and issue the following rules:

"Building Construction Standards" to promulgate standards which are acceptable as a method or as an alternative design for meeting code required performance criteria, to recognize new technical data affecting code requirements, and to eliminate conflicts among code requirements.

"Code Interpretations" to interpret and clarify conditions or language expressed in this code.

Any other rule necessary for the administration of the purpose and intent of this code.

113.2 Procedure for Adoption of Rules. The code official shall promulgate, adopt and issue rules according to the procedures as specified in Chapter 3.02 of the Administrative Code, Seattle Municipal Code.

SECTION 114

CONSTRUCTION CODES ADVISORY BOARD

A committee of the Construction Codes Advisory Board may examine proposed administrative rules, appeals and amendments relating to this code and related provisions of other codes and make recommendations to the code official and to the City Council for changes in this code. The committee will be called on as-needed by the Construction Codes Advisory Board.

SECTION 115

PERMITS

115.1 Permits Required. It is unlawful to make any installation, alteration, repair, replacement or remodel of any mechanical system regulated by this code except as permitted in Section 115.2 of this code, or to allow the same to be done without first obtaining a separate mechanical permit for each separate building or structure. All work shall comply with this code, even where no permit is required.

115.2 Work Exempt from Permit.

115.2.1 Mechanical. A mechanical permit shall not be required for the following:

1. Any portable heating appliance, portable ventilating equipment, or portable cooling unit, provided that the total capacity of these portable appliances shall not exceed 40 percent of the cumulative heating, cooling or ventilating requirements of a building or dwelling unit and shall not exceed 3 kW or 10,000 Btu input.

2. Any closed system of steam, hot or chilled water piping within heating or cooling equipment regulated by this code.

3. Minor work or the replacement of any component part of a mechanical system which does not alter its original approval and complies with other applicable requirements of this code.

115.2.2 Refrigeration. A mechanical permit shall not be required for the following refrigerant equipment:

1. Any self-contained refrigerating equipment for which an operating permit is not required.
2. Any self-contained refrigeration system which does not exceed three horsepower rating.

Exemption from the permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code or any other laws or ordinances of the City.

115.3 Flood Hazard Areas. In addition to the permit required by this section, all work to be performed in areas of special flood hazard, as identified in the report entitled "Flood Insurance Study for King County, Washington and Incorporated Areas" and the accompanying Flood Insurance Rate Maps and filed in C.F. 295948, is subject to additional standards and requirements, including floodplain development approval or a Floodplain Development License, as set forth in Chapter 25.06, the Seattle Floodplain Development Ordinance.

115.4 Emergency Repairs. In the case of an emergency, the installation, alteration or repair of any refrigeration system or equipment may be made without a permit, provided that application for a permit shall be made within twenty-four hours or within one working day from the time when the emergency work was started.

SECTION 116

APPLICATION FOR PERMIT AND INFORMATION ON PLANS AND SPECIFICATIONS

116.1 Application. To obtain a permit, the applicant shall first file an application in writing on a form furnished by the Department of Planning and Development for that purpose. Every such application shall:

1. Identify and describe the work to be covered by the permit for which application is made.

2. Describe the land on which the proposed work is to be done by legal description, property address or similar description that will readily identify and definitely locate the proposed building or work.

3. Provide contractor's state license number (required if permit is to be issued to the contractor). To obtain a permit for work on a refrigeration system, the applicant shall also provide the number of the refrigeration contractor license issued by the City.

4. Be accompanied by plans, diagrams, computations and specifications, equipment schedule and other data as required in Sections 116.2 and 116.3.

5. State the valuation of the mechanical work to be done. The value or valuation of the mechanical work shall be the estimated current value of all labor and material, whether actually paid for or not, for which the permit is issued.

6. Be signed by the owner of the property or building, or his/her authorized agent, who may be required to submit evidence to indicate such authority.

7. Give such other data and information as may be required by the code official.

8. Indicate the name of the owner and contractor and the name, address and phone number of a contact person.

116.2 Plans and Specifications. Plans, engineering calculations, diagrams and other data shall be submitted in one or more sets with each application for a permit. The code official may require plans, computations and specifications to be prepared and designed by an engineer or architect licensed by the state to practice as such. Projects having a total mechanical valuation of $30,000 or larger shall require a mechanical engineering stamp and signature on each sheet.

Exception: The code official may waive the requirements for a mechanical engineer's stamp or submission of plans, calculations or other data if the code official finds that the nature of the work applied for is such that the reviewing of plans is not necessary to obtain compliance with this code.

116.3 Information on Plans and Specifications.

116.3.1 Clarity of plans. Plans shall be drawn to a clearly indicated and commonly accepted scale upon substantial paper such as blueprint quality or standard drafting paper. Tissue paper, posterboard or cardboard will not be accepted. The plans shall be of

microfilm quality and limited to a minimum size of 18 inches by 18 inches and a maximum size of 41 inches by 54 inches.

116.3.2 Fire-resistive notes. The code official may require that plans for buildings more than two stories in height of other than Group R, Division 3 and Group U Occupancies indicate how required structural and fire–resistive integrity will be maintained where a penetration will be made for electrical, mechanical, plumbing and communication conduits, pipes and similar systems.

116.3.3 Information required on plans. The plans or specifications shall show the following:

1. Layout for each floor with dimensions of all working spaces and a legend of all symbols used.

2. Location, size and material of all piping.

3. Location, size and materials of all air ducts, air inlets and air outlets.

4. Location of all fans, warm-air furnaces, boilers, absorption units, refrigerant compressors and condensers and the weight of all pieces of such equipment weighing 200 pounds or more.

5. Rated capacity or horsepower and efficiency rating of all boilers, warm-air furnaces, heat exchangers, blower fans, refrigerant compressors and absorption units. See also the Seattle Energy Code.

6. Location, size and material of all combustion products vents and chimneys.

7. Location and area of all ventilation and combustion air openings and ducts.

8. Location of all air dampers and fire shutters.

9. The first sheet of each set of plans and specifications shall show the address of the proposed work and the name and address of the owner or lessee of the premises.

Plans and specifications shall be of sufficient clarity to show that the proposed installation will conform to the provisions of this code and to the provisions of all applicable laws, ordinances, rules, regulations and orders.

Architectural drawings, typical envelope cross sections and other drawings or data may be required to support system sizing calculations or other thermal requirements of this code or the Seattle Energy Code.

SECTION 117

PERMIT ISSUANCE

117.1 Issuance.

117.1.1 General. The application, plans, specifications, and other data filed by an applicant for permit shall be reviewed by the code official. Such plans may be reviewed by other departments of the City to check compliance with the laws and ordinances under their jurisdiction. If the code official finds that the work as described in an application for a permit and the plans, specifications and other data filed therewith substantially conforms to the requirements of this code and other pertinent laws and ordinances and that the fees specified in the Fee Subtitle have been paid, the code official shall issue a permit to the applicant who becomes the permit holder or authorized agent.

EXCEPTION: The code official may issue a permit for the construction of part of a building or structure before complete plans for the whole building or structure have been submitted or approved, provided that the proposed project complies with the State Environmental Policy Act as adopted by the City (Chapter 25.05 Seattle Municipal Code) and as amended and the Land Use Code as amended; and provided further that adequate information and plans have been filed and checked to assure compliance with all pertinent requirements of this and other pertinent codes. The holder of such a permit shall proceed at his/her own risk without assurance that the permit for the entire building or structure will be granted.

117.1.2 Compliance with approved plans and permit. When the code official issues a permit, the code official shall endorse the permit in writing and endorse in writing or stamp the plans "APPROVED." Such approved plans and permit shall not be changed, modified or altered without authorization from the code official, and all work shall be done in

accordance with the approved plans and permit except as the code official may require during field inspection to correct errors or omissions.

117.1.3 Amendments to the permit. When substitutions or changes are made during construction, approval shall be secured prior to execution, however, the building inspector may approve minor modifications for work not reducing the structural strength and fire and life safety of the structure. The building inspector shall determine if it is necessary to revise the approved plans. These substitutions and changes shall conform to the requirements of this code and other pertinent laws and ordinances. Minor substitutions or changes shall be documented, but shall not incur additional fees if these substitutions and/or changes do not (1) add to the general scope of work; (2) change the basic design concept; (3) involve major relocation of equipment, ducts, or pipes; (4) substantially alter approved equipment size; (5) require extensive re-review of the plans and specifications.

All other changes, substitutions, or clarifications shall be shown on two sets of plans which shall be submitted to and approved by the code official prior to execution or occupancy. These submittals shall be accompanied by appropriate fees as specified in the Fee Subtitle prior to issuance of the Certificate of Occupancy.

117.1.4 Cancellation of permit application. Applications may be cancelled if no permit is issued by the earlier of the following: (1) within twelve months following the date of application; or (2) within sixty days from the date of written notice of approval for issuance. Plans and other data submitted for review may thereafter be returned to the applicant or destroyed by the building official.

The building official shall notify the applicant in writing at least thirty days before the application is cancelled. The notice shall specify a date by which a request for extension must be submitted. The date shall be at least two weeks prior to the date on which the application will be cancelled.

At the discretion of the building official, applications for projects that require more than twelve months to complete may be extended for a period that provides reasonable time to complete the work, but in no case longer than twenty-four months from the date of application. No application shall be extended more than once. In order to renew action on an application after cancellation, the applicant shall submit a new application and pay a new fee.

Notwithstanding other provisions of this code, applications may be extended where issuance of the permit is delayed by litigation, preparation of environmental impact statements, appeals, strikes or other causes related to the application that are beyond the applicant's control, or while the applicant is making progress toward issuance of a master use permit.

See the Fee Subtitle for fee refunds.

117.2 Retention of Plans. One set of approved plans, which may be on microfilm, shall be retained by the code official. One set of approved plans shall be returned to the applicant, and shall be kept at the site of the building or work at all times during which the work authorized is in progress for use by the inspection personnel.

117.3 Validity of permit. The issuance or granting of a permit or approval of plans shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of this code or other pertinent laws and ordinances. No permit presuming to give authority to violate or cancel the provisions of this code shall be valid, except insofar as the work or use which it authorizes is lawful.

The issuance of a permit based upon plans shall not prevent the code official from thereafter requiring the correction of errors in said plans, or from preventing building operations being carried on thereunder when in violation of this code or of other pertinent laws and ordinances of the City.

The issuance of a mechanical permit shall not prevent the code official from requiring correction of conditions found to be in violation of this code or other pertinent laws of the City, nor shall the period of time for which any such permit is issued be construed to extend or otherwise affect any period of time for compliance specified in any notice or order issued by the code official or other administrative authority requiring the correction of any such conditions.

117.4 Permit Expiration and Renewal.

117.4.1 Expiration. Permits and renewed permits shall expire eighteen months from the date of issuance.

Exceptions:

1. Initial permits for major construction projects that require more than eighteen months to complete, according to a construction schedule submitted by the applicant, may be issued for a period that provides reasonable time to complete the work but in no case longer than three years.

2. Permits which expire in less than eighteen months may be issued where the code official determines a shorter period is appropriate.

117.4.2 Renewal. Permits may be renewed and renewed permits may be further renewed by the code official, provided the following conditions are met:

1. Application for renewal shall be made within the thirty-day period immediately preceding the date of expiration of the permit;

2. The work authorized by the permit has been started and is progressing at a rate approved by the code official. Progress justifying renewal of a permit, except as specified by Item 3, shall include, but is not limited to, requesting of a required inspection, the arranging of financing, selection of contractors and subcontractors, securing other necessary permits and licenses, site preparation such as demolition, clearing and excavation, soils investigation and work done to overcome unusual construction difficulties;

3. If an application for renewal is made either more than eighteen months after the date of mandatory compliance with a new or revised edition of this code or after the

effective date of an amendment to applicable provisions of the Land Use Code, the permit shall not be renewed unless:

(i) The code official determines that the permit complies, or is modified to comply with the code or codes in effect on the date of application renewal; or

(ii) The work authorized by the permit is substantially underway and progressing at a rate approved by the code official. Progress justifying renewal of the permit shall be evidenced by notification by the permit holder that a construction step is ready for an inspection required by Section 119.4 of this code.

Permits may also be renewed where commencement or completion of the work authorized by the permit is delayed by litigation, appeals, strikes or other causes related to the work authorized by the permit, beyond the permit holder's control.

117.4.3 Re-establishment. A new permit shall be required to complete work where a permit has expired and was not renewed.

Exception: A permit which has been expired for less than one year may be reestablished upon approval of the code official provided it complies with Items 2 and 3 of Section 117.4.2.

117.5 Suspension or Revocation. The code official may, by written order, suspend or revoke a permit issued under the provisions of this code whenever the permit is issued in error or on the

basis of incorrect information supplied, or in violation of any ordinance or regulation or any provisions of this code.

SECTION 118
FEES

A fee for each mechanical permit and for other activities related to the enforcement of this code shall be paid as set forth in the Fee Subtitle.

SECTION 119
INSPECTIONS

119.1 General. All construction or work for which a permit is required is subject to inspection by the code official, and certain types of construction shall have special inspections by registered special inspectors as specified in Section 1704 of the Seattle Building Code.

119.2 Inspection Requests. It is the duty of the owner of the property or the owner's authorized agent, or the person designated by the owner/agent to do the work authorized by a permit, to notify the code official that work requiring inspection as specified in this section and Section 120 is ready for inspection.

It is the duty of the person requesting any inspections required by this code to provide access to and means for proper inspection of such work. It is the duty of the permit holder to cause the work to be accessible and exposed for inspection purposes until approved by the code official.

Neither the code official nor the City shall be liable for expense entailed in the required removal or replacement of any material to allow inspection.

119.3 Inspection Record. Work requiring a mechanical permit shall not be commenced until the permit holder or agent has posted an inspection record in a conspicuous place on the premises and in a position which allows the code official to conveniently make the required entries thereon regarding inspection of the work. This record shall be maintained in such a position by the permit holder until final approval has been granted by the code official.

119.4 Approvals Required. No work shall be done on any part of the building or structure beyond the point indicated in each successive inspection without first obtaining the written approval of the code official. Such written approval shall be given only after an inspection has been made of each successive step in the construction as indicated by each of the inspections required in this section.

All mechanical systems for which a permit is required by this code shall be inspected by the code official. No portion of any mechanical system intended to be concealed shall be concealed until inspected and approved. Neither the code official nor the City shall be liable for expense entailed in the removal or replacement of material required to permit inspection. When the installation of a mechanical system is complete, an additional and final inspection shall be made.

Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other pertinent laws and ordinances of the City. Inspections

presuming to give authority to violate or cancel the provisions of this code or of other pertinent laws and ordinances of the City shall not be valid.

119.5 Operation of Mechanical Equipment. The requirements of this section shall not be considered to prohibit the operation of any mechanical systems installed to replace existing equipment or fixtures serving an occupied portion of the building in the event a request for inspection of such equipment or fixture has been filed with the code official more than 48 hours after such replacement work is completed, and before any portion of such mechanical system is concealed by any permanent portion of the building.

119.6 Testing of Equipment and Systems. Refrigeration equipment regulated by this code shall be tested and approved as required by Chapter 11 of this code.

Fuel–gas piping shall be tested and approved as required by Chapter 13 of this code.

119.7 Other Inspections. In addition to the called inspections required by this code, the code official may make or require any other inspections of any mechanical work to ascertain compliance with the provisions of this code and other laws and ordinances which are enforced by the code official.

Where work for which any permit or approval is required is commenced or performed prior to making formal application and receiving the code official's permission to proceed, the code official may make a special investigation inspection before a permit may be issued for such work. Where a special investigation is made, a special investigation fee may be assessed in accordance with the Fee Subtitle.

119.8 Reinspections. The code official may require a reinspection when work for which inspection is called is not complete, corrections called for are not made, the inspection record is not properly posted on the work site, the approved plans are not readily available to the inspector, for failure to provide access on the date for which inspection is requested, or when deviations from plans which require the approval of the code official have been made without proper approval.

For the purpose of determining compliance with Section 104.4, Maintenance, the code official or the Fire Chief may cause any structure to be reinspected.

The code official may assess a reinspection fee as set forth in the Fee Subtitle for any action listed above for which reinspection may be required. In instances where reinspection fees have been assessed, no additional inspection of the work shall be performed until the required fees have been paid.

SECTION 120
CONNECTION APPROVAL

120.1 Energy Connections. No person shall make connections from a source of energy fuel to a mechanical system or equipment regulated by this code and for which a permit is required until approved by the code official.

120.2 Temporary Connections. The code official may authorize temporary connection of the mechanical equipment to the source of energy fuel for the purpose of testing the equipment, or for use under a temporary certificate of occupancy.

SECTION 121

REFRIGERATION LICENSES

No one shall perform any of the services or activities related to refrigeration systems as regulated by Chapter 11 without a license as required by Chapter 6.82 of the Seattle Municipal Code, or under the direct supervision of a person, firm, associates or corporation holding a required license.

SECTION 122

OPERATING PERMITS FOR REFRIGERATION SYSTEMS

122.1 An operating permit issued by the code official shall be required to operate any refrigeration system meeting any one of the following criteria:

1. Any system over 50 horsepower, or

2. Any system over 50 tons of refrigerant effect, or

3. Any system which contains over 150 pounds of refrigerant, or

4. Any system which includes a refrigerant containing a pressure vessel over six inches in diameter with a capacity of more than 5 cubic feet and a design working pressure under 250 psig., or

5. Any system which includes a refrigerant containing a pressure vessel over six inches in diameter having a capacity of one and one-half cubic feet and a design working pressure over 250 psig.

122.2 The operating permit shall not be issued until the system has been inspected and approved by the code official as to its safe operation and compliance with the provisions of this code. The permit shall be valid for a period of one year, renewable annually. The permit shall be displayed in a conspicuous place adjacent to the refrigeration system.

Section 4. Subsection 201.3 of the International Mechanical Code, 2003 Edition, is amended as follows:

201.3 Terms defined in other codes. Where terms are not defined in this code and are defined in the *International Building Code*, ((~~ICC~~)) *Seattle Electrical Code*, *International Fire Code*, *International Fuel Gas Code* or the ((~~*International*~~)) *Uniform Plumbing Code*, such terms shall have meanings ascribed to them as in those codes.

Interpretation I201.3: Unless otherwise amended, whenever an International, National, or Uniform code is referenced in this code, it shall mean the Seattle edition of that code, including local amendments.

Section 5 Section 202 of the International Mechanical Code, 2003 Edition, is amended as follows:

The following terms and their respective definitions are deleted: automatic boiler, power boiler, pressure vessels, and steam heating boiler.

The following terms and definitions are added and amended:

BOILER. A closed heating appliance intended to supply hot water or steam for space heating, processing or power purposes. ((~~Low-pressure boilers operate at pressures less than or equal to 15 pounds per square inch (psi) (103 kPa) for steam and 160 psi (1103 kPa) for water. High-pressure boilers operate at pressures exceeding those pressures.~~))

BOILER CODE. The *Seattle Boiler and Pressure Vessel Code*.

CODE. These regulations, subsequent amendments thereto, or any emergency rule or regulation that ((~~the administrative authority having jurisdiction~~)) has been lawfully adopted.

CODE OFFICIAL. The ((~~officer or other designated authority charged with the administration and enforcement of this code,~~)) Director of the Department of Planning and Development or a duly authorized representative.

CONDITIONED SPACE. ((~~An area, room or space being heated or cooled by any equipment or appliance~~)) A cooled space, heated space (fully heated), heated space (semi-heated), or indirectly conditioned space.

CONTAINER (REFRIGERANT). A cylinder for the transportation of refrigerant.

CRITICAL PRESSURE, CRITICAL TEMPERATURE AND CRITICAL VOLUME. Terms given to the state points of a substance at which liquid and vapor have identical properties. Above the critical pressure or critical temperature there is no line of demarcation between liquid and gaseous phases.

DAMPER. A manually or automatically controlled device to regulate draft or the rate of flow of air or combustion gases.

Volume damper. A device that, when installed, will restrict, retard or direct the flow of air in a duct, or the products of combustion in a heat-producing appliance, its vent connector, vent or chimney therefrom.

Backdraft damper. A damper installed to restrict introduction of unconditioned air from and unconditioned space to a conditioned space.

Barometric damper. Any listed device that freely allows the flow of air in one direction, but does not allow conditioned air to escape. All installed combustion air dampers shall meet the installation requirements of the manufacturer.

Chimney Damper. A movable valve or plate within the chimney connector for controlling the draft or flow of combustion gases.

Fire Damper. See "fire damper".

Smoke Damper. See "smoke damper".

DIRECT REFRIGERATION SYSTEM. A system in which the evaporator or condenser of the refrigerating system is in direct contact with the air or other substances to be cooled or heated. See Figure 2-1.

Double direct refrigeration system. A system in which an evaporative refrigerant is used in a secondary circuit to condense or cool a refrigerant in a primary circuit. For the purpose of this code, each system enclosing a separate body of an evaporative refrigerant shall be considered as a separate direct system. See Figure 2-2.

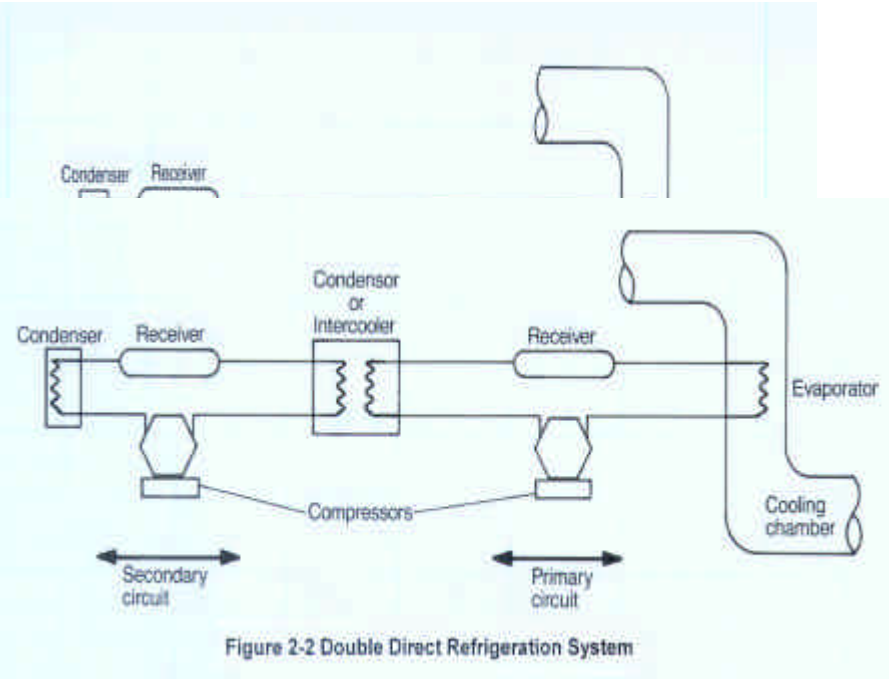

Figure 2-2 Double Direct Refrigeration System

DUCT. A tube or conduit utilized for conveying air. The air passages of self-contained systems are not to be construed as air ducts.

Environmental air duct. Ducts used for conveying exhaust air at temperatures not exceeding 250°F (121°C) to or from occupied areas of any occupancy. Examples of environmental air ducts include, but are not limited to, those used for ventilation for human usage, domestic kitchen range exhaust, bathroom or restroom exhaust, parking garage exhaust, elevator exhaust and domestic-type clothes dryer exhaust.

Product-conveying duct. Ducts used for conveying solid particulates, such as refuse, dust, fumes and smoke; liquid particulate matter, such as spray residue, mists and fogs; vapors, such as vapors from flammable or corrosive liquids; noxious and toxic gases; and air at temperatures exceeding 250°F (121°C). Examples of product-conveying ducts include, but are not limited to, those that serve a combustion engine, industrial vacuum system, chemical booth, paint booth, paint enclosure and photo lab exhaust.

ENERGY CODE. The *Washington State Energy Code with Seattle Amendments.*

ENVIRONMENTAL AIR. Exhaust air at temperatures not exceeding 250°F (121°C) to or from occupied areas of any occupancy. Examples of environmental air include air used for human ventilation, domestic kitchen range exhaust, bathroom or restroom exhaust, parking garage exhaust, elevator exhaust and Type 1 clothes dryer exhaust.

[B] FIRE DAMPER. A listed device, installed in ducts and air transfer openings of an air distribution system or smoke control systems, designed to close automatically upon detection of

heat, to interrupt migratory airflow, and to restrict the passage of flame. Fire dampers are classified for use in either static systems that will automatically shut down in the event of a fire, or in a dynamic system that continues to operate during a fire. A dynamic fire damper is tested and rated for closure under airflow.

[F] GAS ROOM. A separately ventilated, fully enclosed room in which only compressed gases and associated equipment and supplies are stored or used.

HOOD. An air-intake device used to capture by entrapment, impingement, adhesion or similar means, grease and similar contaminants before they enter a duct system.

Type I. A kitchen hood for collecting and removing grease vapors and smoke generated from medium-duty, heavy-duty, extra-heavy-duty, and some light-duty cooking appliances.

Type II. A general kitchen hood for collecting and removing steam, vapor, heat and odors generated from some light-duty cooking appliances.

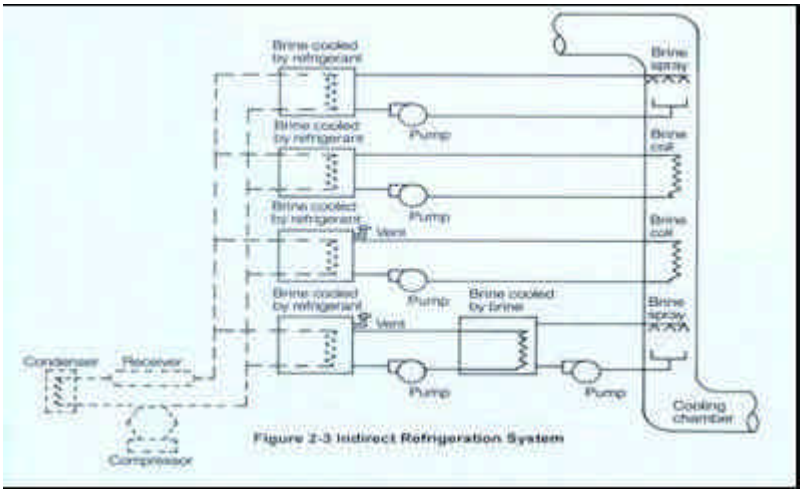

Figure 2-3 Indirect Refrigeration System

INDIRECT REFRIGERATION SYSTEM. A system in which a secondary coolant cooled or heated by the refrigerating system is circulated to the air or other substance to be cooled or heated. See Figure 2-3. Indirect systems are distinguished by the method of application shown below:

Closed system. A system in which a secondary fluid is either cooled or heated by the refrigerating system and then circulated within a closed circuit in indirect contact with the air or other substance to be cooled or heated.

Double-indirect open-spray system. A system in which the secondary substance for an indirect open-spray system is heated or cooled by an intermediate coolant circulated from a second enclosure.

Open-spray system. A system in which a secondary coolant is cooled or heated by the refrigerating system and then circulated in direct contact with the air or other substance to be cooled or heated.

Vented closed system. A system in which a secondary coolant is cooled or heated by the refrigerating system and then passed through a closed circuit in the air or other substance to be cooled or heated, except that the evaporator or condenser is placed in an open or appropriately vented tank.

LIGHT-DUTY COOKING APPLIANCE. Light-duty cooking appliances include gas and electric ovens of a maximum 6 kW or 20,000 Btu/h capacity (including standard, bake, roasting, coffee roasting, revolving, retherm, convection, combination convection/steamer, conveyor,

deck or deck-style pizza, and pastry), electric and gas steam-jacketed kettles, electric and gas compartment steamers (both pressure and atmospheric) and electric and gas cheesemelters.

MEDIUM-DUTY COOKING APPLIANCE. Medium-duty cooking appliances include electric discrete element ranges (with or without oven), electric and gas hot-top ranges, electric and gas griddles, electric and gas double-sided griddles, electric and gas fryers (including open deep fat fryers, donut fryers, kettle fryers, and pressure fryers), ((~~electric and gas pasta cookers, electric and gas conveyor pizza ovens,~~)) electric and gas tilting skillets (braising pans) and electric and gas rotisseries.

SATURATION PRESSURE. The pressure at which there is a stable coexistence of the vapor and liquid or the vapor and solid phases of a refrigerant.

SLEEVE. A factory-built chimney fitting designed to protect combustible materials when it is necessary to penetrate a combustible wall to connect a chimney.

THIMBLE. A listed fitting designed to be installed in the opening in a masonry chimney through which the chimney connector passes.

UNUSUALLY TIGHT CONSTRUCTION. Construction meeting the following requirements:

1. Walls exposed to the outside atmosphere having a continuous water vapor retarder with a rating of 1 perm (57 ng/s • m^2 • Pa) or less with openings gasketed or sealed;

2. Openable windows and doors meeting the air leakage requirements of the *International Energy Conservation Code*, Section 502.1.4; and

3. Caulking or sealants are applied to areas, such as joints around window and door frames, between sole plates and floors, between wall-ceiling joints, between wall panels, at penetrations for plumbing, electrical and gas lines, and at other openings.

[W] 4. Buildings built in compliance with the 1986 or later editions of the *Washington State Energy Code*, Chapter 51-11 WAC; Northwest Energy Code; or Super Good Cents weatherization standards or equivalent.

Interpretation: 1986 and later editions of the *Seattle Energy Code, the Washington State Energy Code with Seattle Amendments*, and Seattle City Light's Built Smart program are considered equivalent.

WATER HEATER. Any heating appliance or equipment, not exceeding a pressure of 160 psi, a volume of 120 gallons and a heat input of 200,000 Btu/h, that heats potable water and supplies such water to the potable hot water distribution system.

Section 6 Subsections 301.1 and 301.2 of the International Mechanical Code, 2003 Edition, are amended as follows:

301.1 Scope. This chapter shall govern the approval and installation of all equipment and appliances that comprise parts of the building mechanical systems regulated by this code in accordance with Section ((~~101.2~~)) 103.1.

301.2 Energy utilization. Heating, ventilating and air-conditioning systems of all structures shall be designed and installed for efficient utilization of energy in accordance with the ((~~*International Energy Conservation Code*~~)) *Washington State Energy Code with Seattle Amendments*.

Section 7 Subsection 301.4 of the International Mechanical Code, 2003 Edition, is amended as follows:

301.4 Listed and labeled. All appliances regulated by this code shall be listed and labeled, unless otherwise approved in accordance with Sections 105, 106 or 107.

Section 8 Subsections 301.7 and 301.8 of the International Mechanical Code, 2003 Edition, are amended as follows:

301.7 Electrical. Electrical wiring, controls and connections to equipment and appliances regulated by this code shall be in accordance with the ((~~ICC~~) *Seattle Electrical Code*.

301.8 Plumbing connections. Potable water supply and building drainage system connections to equipment and appliances regulated by this code shall be in accordance with the ((~~*International*~~))-*Uniform Plumbing Code*.

Section 9. Subsection 303.3 of the International Mechanical Code, 2003 Edition, is amended as follows:

303.3 Prohibited locations. Fuel-fired appliances shall not be located in, or obtain combustion air from, any of the following rooms or spaces:

1. Sleeping rooms.

2. Bathrooms.

3. Toilet rooms.

4. Storage closets.

5. Surgical rooms.

Exception: This section shall not apply to the following appliances:

1. Direct-vent appliances that obtain all combustion air directly from the outdoors.
2. Solid fuel-fired appliances, provided that the room is not a confined space and the building is not of unusually tight construction.
3. Appliances installed in a dedicated enclosure in which all combustion air is taken directly from the outdoors, in accordance with Section 703. Access to such enclosure shall be through a solid door, weather-stripped in accordance with the exterior door air leakage requirements of the ((~~*International Energy Conservation Code*~~)) *Washington State Energy Code with Seattle Amendments* and equipped with an approved self-closing device.

Section 10. Subsections 303.7 and 303.8 of the International Mechanical Code, 2003 Edition, are amended as follows:

303.7 Pit locations. Appliances installed in pits or excavations shall not come in direct contact with the surrounding soil. The sides of the pit or excavation shall be held back a minimum of 12 inches (305 mm) from the appliance, and a minimum of 30 inches (762 mm) on the control side. Where the depth exceeds 12 inches (305 mm) below adjoining grade, the walls of the pit or excavation shall be lined with concrete or masonry. Such concrete or masonry shall extend a minimum of 4 inches (102 mm) above adjoining grade and shall have sufficient lateral load-bearing capacity to resist collapse. The appliance shall be protected from flooding in an approved manner.

[B] 303.8 ((~~**Elevator shafts.** Mechanical systems shall not be located in an elevator shaft.~~)) **Installation of Pipes or Ducts Conveying Gases, Vapors or Liquids in Hoistways, Machine Rooms, or Machinery Spaces.** Pipes and ducts conveying gases, vapors or liquids are not permitted to be installed in hoistways, machine rooms, and machinery spaces.

Exceptions:

1. Only ducts for heating, cooling, ventilating, and venting these spaces are permitted to be installed in the hoistway, machine room, and machinery space.

2. Ducts and electrical conduit may pass through an elevator machine room or machinery space provided they are separated from the room or space by construction equal to the rated construction of the room or space and located so that all required clearances are maintained.

If a vented machine room is not vented directly to the outside of the building, the vent shall be enclosed within a fire barrier with at least a one-hour fire-resistance rating, or as required for shafts where it passes through occupied floors.

3. Standard sprinkler protection conforming to the requirements of NFPA 13 shall be permitted to be installed in these spaces, subject to rules promulgated by the code official.

4. Subject to the approval of the building official, pipes protected with double containment and pipes with threaded or welded joints may be permitted. Pipes shall not be located less than 7 feet above the floor in machine rooms.

Section 11. A new subsection 303.9 is added to the Seattle Mechanical Code, 2003 Edition, as follows:

[B] 303.9 Exit Enclosures. Mechanical systems shall not be located in exit enclosures. Penetrations passing entirely through both protective membranes are prohibited.

Exceptions:

1. Equipment allowed or required by the *International Building Code* to serve the exit enclosure such as ductwork and equipment necessary for independent stairway pressurization, sprinkler piping, standpipes, electrical conduit terminating in a listed box not exceeding 16 square inches (10,323 mm^2) in area, and piping used exclusively for

the drainage of rainfall runoff from roof areas provided the roof shall not be used for a helistop or heliport.

2. Unfired heaters allowed by the *International Building Code* for freeze protection of fire protection equipment may penetrate one protective membrane. The conduit serving the heater may penetrate both protective membranes.

Penetrations and communicating openings between exit enclosures in the same building are not permitted regardless of their protection. Penetrations shall be protected as required by the *International Building Code*.

Section 12. Subsections 306.3 and 306.4 of the International Mechanical Code, 2003 Edition, are amended as follows:

306.3 Appliances in attics. Attics containing appliances requiring access shall be provided with an opening and unobstructed passageway large enough to allow removal of the largest appliance. The passageway shall not be less than 30 inches (762 mm) high and 22 inches (559 mm) wide and not more than 20 feet (6096 mm) in length measured along the centerline of the passageway from the opening to the appliance. The passageway shall have continuous solid flooring not less than 24 inches (610 mm) wide. A level service space not less than 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present at the front or service side of the appliance. The clear access opening dimensions shall be a minimum of 20 inches by 30 inches (508 mm by 762 mm), where such dimensions are large enough to allow removal of the largest appliance.

Exception: The passageway and level service space are not required where the appliance is capable of being serviced and removed through the required opening.

306.3.1 Electrical requirements. A lighting fixture controlled by a switch located at the required passageway opening and a receptacle outlet shall be provided at or near the appliance location in accordance with the ((~~ICC~~)) *Seattle Electrical Code.*

306.4 Appliances under floors. Underfloor spaces containing appliances requiring access shall be provided with an access opening and unobstructed passageway large enough to remove the largest appliance. The passageway shall not be less than 30 inches (762 mm) high and 22 inches (559 mm) wide, nor more than 20 feet (6096 mm) in length measured along the centerline of the passageway from the opening to the appliance. A level service space not less than 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present at the front or service side of the appliance. If the depth of the passageway or the service space exceeds 12 inches (305 mm) below the adjoining grade, the walls of the passageway shall be lined with concrete or masonry. Such concrete or masonry shall extend a minimum of 4 inches (102 mm) above the adjoining grade and shall have sufficient lateral-bearing capacity to resist collapse. The clear access opening dimensions shall be a minimum of 22 inches by 30 inches (559 mm by 762 mm), where such dimensions are large enough to allow removal of the largest appliance.

Exception: The passageway is not required where the level service space is present when the access is open and the appliance is capable of being serviced and removed through the required opening.

306.4.1 Electrical requirements. A lighting fixture controlled by a switch located at the required passageway opening and a receptacle outlet shall be provided at or near the appliance location in accordance with the ((~~ICC~~)) *Seattle Electrical Code*.

Section 13. Subsection 309.1 of the International Mechanical Code, 2003 Edition, is amended as follows:

[B] 309.1 Space-heating systems. Interior spaces intended for human occupancy shall be provided with active or passive space-heating systems capable of maintaining ((~~a minimum~~)) an average indoor temperature of 68°F (20°C) at a point 3 feet (914 mm) above the floor ((~~on the design heating day~~)) when the outside temperature is 24°F. The installation of portable space heaters shall not be used to achieve compliance with this section.

Exception: Interior spaces where the primary purpose is not associated with human comfort.

Section 14. Subsection 312.1 of the International Mechanical Code, 2003 Edition, is amended as follows:

312.1 Load calculations. Heating and cooling system design loads for the purpose of sizing systems, appliances and equipment shall be determined in accordance with the procedures described in the ((~~ASHRAE *Handbook of Fundamentals*~~)) *Washington State Energy Code with Seattle Amendments*. ((~~Heating and cooling loads shall be adjusted to account for load reductions that are achieved when energy recovery systems are utilized in the HVAC system in accordance with the ASHRAE Handbook - *HVAC Systems and Equipment*. Alternatively,~~

~~design loads shall be determined by an approved equivalent computation procedure, using the design parameters specified in Chapter 3 of the *International Energy Conservation Code*.~~))

Section 15. Subsection 401.2 of the International Mechanical Code, 2003 Edition, is amended as follows:

401.2 Ventilation required. ((~~Every occupied space~~))

401.2.1 Group R occupancies. All Group R occupancies, regardless of number of stories, shall be ventilated as required by Sections 302 or 303 of the *Washington State Ventilation and Indoor Air Quality Code (WSVIAQ).*

401.2.2 All other occupancies. All other occupancies shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403.

Section 16. Subsection 401.5 of the International Mechanical Code, 2003 Edition, is amended as follows:

401.5 Opening location. Outdoor air exhaust and intake openings shall be located a minimum of 10 feet (3048 mm) from lot lines or buildings on the same lot. Where openings front on a street or public way, the distance shall be measured to the ((~~centerline~~)) opposite side of the street or public way.

Exception: Group R((~~-3~~)).

Interpretation: For purposes of this section, property line shall include any property line separating one lot from another lot, but shall not include any property line separating a lot from a public street or alley right-of-way.

401.5.1 Intake openings. Mechanical and gravity outside air intake openings, shall be located a minimum of 10 feet (3048 mm) from any hazardous or noxious contaminant such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks, except as otherwise specified in this code. Where a source of contaminant is located within 10 feet (3048 mm) of an intake opening, such opening shall be located a minimum of 2 feet (610 mm) below the contaminant source. Intake openings shall not be located in crawlspaces or less than one foot (305 mm) above a roof, adjacent grade, or other surface directly below the intake.

401.5.2 Exhaust openings. ((~~Outdoor exhaust openings shall be located so as not to create a nuisance. Exhaust air shall not be directed onto walkways.~~)) The termination point or exhaust outlet for exhaust ducts shall discharge to the outside of the building and shall be located, at a minimum, as follows: 3 feet (914 mm) from the property line; 3 feet (914 mm) from operable openings into the building for all occupancies other than Group U, and 10 feet (3048 mm) from a mechanical air intake. This includes environmental air regulated by Sections 504 and 505, but does not include enclosed parking garage exhaust outlets regulated by Section 404.

Exceptions:

1. The separation between an air intake and exhaust outlet on a single listed package HVAC unit.

2. Exhaust from environmental air systems other than garages may be discharged into an open parking garage.

3. Where ventilation system design circumstances require building HVAC air to be relieved, such as during economizer operation, such air may be relieved into an open or enclosed parking garage within the same building.

[B] 401.5.3 Flood hazard. For structures located in flood hazard areas, outdoor exhaust openings shall be at or above the design flood elevation.

Section 17. Subsection 402.1 of the International Mechanical Code, 2003 Edition, is amended as follows:

402.1 Natural ventilation. Natural ventilation of an occupied space shall be designed to occur through windows, doors, louvers or other openings to the outdoors. The operating mechanism for such openings shall be provided with ready access so that the openings are readily controllable by the building occupants.

Exception: Automatically controlled natural ventilation systems do not require ready access and control by building occupants.

Section 18. Subsections 403.2 and 403.3 of the International Mechanical Code, 2003 Edition, are amended as follows:

403.2 Outdoor air required. The minimum ventilation rate of required outdoor air shall be determined in accordance with Section 403.3.

403.2.1 Recirculation of air. The air required by Section 403.3 shall not be recirculated. Air in excess of that required by Section 403.3 shall not be prohibited from being recirculated as a component of supply air to building spaces, except that:

1. Ventilation air shall not be recirculated from one dwelling unit to another or to dissimilar occupancies.

2. Supply air to a swimming pool and associated deck areas shall not be recirculated unless such air is dehumidified to maintain the relative humidity of the area at 60 percent or less. Air from this area shall not be recirculated to other spaces.

3. Where mechanical exhaust is required by Table 403.3, recirculation of air from such spaces shall be prohibited. All air supplied to such spaces shall be exhausted, including any air in excess of that required by Table 403.3.

4. Building HVAC air used as transfer air for heat removal may be recirculated.

403.2.2 Transfer air. Except where recirculation from such spaces is prohibited by Table 403.3, air transferred from occupied spaces is not prohibited from serving as makeup air for required exhaust systems in such spaces as kitchens, baths, toilet rooms, elevators and smoking lounges. The amount of transfer air and exhaust air shall be sufficient to provide the flow rates as specified in Sections 403.3 and 403.3.1. The required outdoor air rates

specified in Table 403.3 shall be introduced directly into such spaces or into the occupied spaces from which air is transferred or a combination of both.

403.2.3 Outdoor air delivery. The outdoor air shall be ducted in a fully enclosed path directly to every air handling unit in each zone not provided with sufficient operable opening area for natural ventilation to occur.

Exception: Ducts may terminate within 12 inches of the intake to an HVAC unit provided they are physically fastened so that the outside air duct is directed into the unit intake.

403.3 Ventilation rate. Ventilation systems shall be designed to have the capacity to supply the minimum outdoor airflow rate determined in accordance with Table 403.3 based on the occupancy of the space and the occupant load or other parameter as stated therein. The occupant load utilized for design of the ventilation system shall not be less than the number determined from the estimated maximum occupant load rate indicated in Table 403.3. Ventilation rates for occupancies not represented in Table 403.3 shall be determined by an approved engineering analysis. The ventilation system shall be designed to supply the required rate of ventilation air continuously during the period the building is occupied, except as otherwise stated in other provisions of the code.

Exception: ((~~The occupant load is not required to be determined, based on the estimated maximum occupant load rate indicated in Table 403.3 where approved statistical data document the accuracy of an alternate anticipated occupant density~~)) Where occupancy density is known and documented in the plans, the outside air rate may be based on the

design occupant density. Under no circumstance shall the occupancies used result in outside air less than one-half that resulting from application of Table 403.3 estimated maximum occupancy rates.

403.3.1 System operation. The minimum flow rate of outdoor air that the ventilation system must be capable of supplying during its operation shall be permitted to be based on the rate per person indicated in Table 403.3 and the actual number of occupants present.

403.3.2 Common ventilation system. Where spaces having different ventilation rate requirements are served by a common ventilation system, the ratio of outdoor air to total supply air for the system shall be determined based on the space having the largest outdoor air requirement or shall be determined in accordance with the following formula:

$$Y = \frac{X}{(1 + X - Z)} \qquad \textbf{(Equation 4-1)}$$

Where

$Y = V_{ot}/V_{st}$= Corrected fraction of outdoor air in system supply.

$X = V_{on}/V_{st}$= Uncorrected fraction of outdoor air in system supply

$Z = V_{oc}/V_{sc}$= Fraction of outdoor air in critical space. The critical space is that space with the greatest required fraction of outdoor air in the supply to this space.

V_{ot}= Corrected total outdoor airflow rate.

V_{st}= Total supply flow rate, i.e., the sum of all supply for all branches of the system.

V_{on}= Sum of outdoor airflow rates for all branches on system.

V_{oc}= Outdoor airflow rate required in critical spaces.

V_{sc}= Supply flow rate in critical space.

403.3.3 Variable air volume system control. Variable air volume air distribution systems, other than those designed to supply only 100-percent outdoor air, shall be provided with controls to regulate the flow of outdoor air. Such control system shall be designed to maintain the flow of outdoor air at a rate of not less than that required by Section 403 over the entire range of supply air operating rates.

403.3.4 Balancing. Ventilation systems shall be balanced by an approved method. Such balancing shall verify that the ventilation system is capable of supplying the airflow rates required by Section 403.

403.3.5 Ventilation of buildings used for the repair of automobiles. In all buildings used for the repair of automobiles, each repair stall shall be equipped with an exhaust extension duct, extending to the outside of the building, which if over 10 feet in length, shall mechanically exhaust 300 cfm. Connecting offices and waiting rooms shall be supplied with conditioned air under positive pressure.

TABLE 403.3
REQUIRED OUTDOOR VENTILATION AIR

OCCUPANCY CLASSIFICATION	ESTIMATED MAXIMUM OCCUPANT LOAD, PERSONS PER 1,000 SQUARE FEET[a]	OUTDOOR AIR (Cubic feet per Minute (cfm) Per person) UNLESS NOTED[e]
Correctional facilities		
Cells		
without plumbing fixtures	20	20
with plumbing fixtures		
Dining halls	20	20
Guard stations	100	15
	40	15
Dry Cleaners, laundries		
Coin-operated dry cleaner	20	15
Coin-operated laundries	20	15
Commercial dry cleaner	30	30

Commercial laundry	10	25
Storage, pick up	30	35
Education		
Auditoriums	150	15
Classrooms	50	15
Corridors	—	0.10 cfm/ft^2
Laboratories	30	20
Libraries	20	15
Locker rooms[b]	—	0.50 cfm/ft^2
Music rooms	50	15
Smoking lounges[b,g]	70	60
Training shops	30	20
Food and beverage service		
Bars, cocktail lounges	100	30
Cafeteria, fast food	100	20
Dining rooms	70	20
Kitchens (cooking)[f,g]	20	15
Hospitals, nursing and convalescent homes		
Autopsy rooms[b]	—	0.50 cfm/ft^2
Medical procedure rooms	20	15
Operating rooms	20	30
Patient rooms	10	25
Physical therapy	20	15
Recovery and ICU	20	15
Hotels, motels, resorts and dormitories		
Assembly rooms	120	15
Bathrooms[b,g]	—	35 cfm per room
Bedrooms	—	30 cfm per room
Conference rooms	50	20
Dormitory sleeping areas	20	15
Gambling casinos	120	30
Living rooms	—	30 cfm per room
Lobbies	30	15
Offices		
Conference rooms	50	20
Office spaces	7	20
Reception areas	60	15
Telecommunication centers and data entry	60	20
Private dwellings, single and Multiple		

Living areas[c]	Based upon number of bedrooms. first bedroom: 2; each additional bedroom: 1	0.35 air changes per hour[a] or 15 cfm per person, whichever is greater
Kitchens[g]	—	100 cfm intermittent or 25 cfm continuous
Toilet rooms and bathrooms[g]	—	mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous
Garages, separate for each dwelling	—	100 cfm per car
Garages, common for multiple units[b]	—	((~~1.5~~)) 1.0 cfm/ft^2
Public spaces		
Corridors and utilities	—	0.05 cfm/ft^2
Elevators[g]	—	1.00 cfm/ft^2
Locker rooms[b]	—	0.5 cfm/ft^2
Toilet rooms[b,g]	—	75 cfm per water closet or urinal
Shower room (per shower head) [b,g]		50 cfm intermediate or 20 cfm continuous
Smoking lounges[b,g]	70	60
Retail stores, sales floors and Showroom floors		
Basement and street	—	0.30 cfm/ft^2
Dressing rooms	—	0.20 cfm/ft^2
Malls and arcades	—	0.20 cfm/ft^2
Shipping and receiving	—	0.15 cfm/ft^2
Smoking lounges[b]	70	60
Storage rooms	—	0.15 cfm/ft^2
Upper floors	—	0.20 cfm/ft^2
Warehouses	—	0.05 cfm/ft^2
Specialty shops		
Automotive service stations	—	1.5 cfm/ft^2
Barber		
Beauty	25	15
Clothiers, furniture	25	25
Florists	—	0.30 cfm/ft^2

Hardware, drugs, fabrics	8	15
Nail salon[b]	8	15
Pet shops	—	25
Reducing salons	—	1.00 cfm/ft^2
Supermarkets	20	15
	8	15
Sports and amusement		
Ballrooms and discos	100	25
Bowling alleys (seating areas)	70	25
Game rooms	70	25
Ice arenas	—	0.50 cfm/ft^2
Playing floors (gymnasiums)	30	20
Spectator areas		
Swimming pools (pool and deck area)	150	15
	—	0.50 cfm/ft^2
Storage		
Repair garages	—	1.5 cfm/ft^2
Loading docks	—	1.5 cfm/ft^2
((e))Enclosed parking garages[d]	—	1.0 cfm/ft^2
	—	0.05 cfm/ft^2
Warehouses		
Theaters		
Auditoriums	150	15
Lobbies	150	20
Stages, studios	70	15
Ticket booths	60	20
Transportation		
Platforms	100	15
Vehicles	150	15
Waiting rooms	100	15
Workrooms		
Bank vaults	5	15
Darkrooms	—	0.50 cfm/ft^2
Duplicating, printing	—	0.50 cfm/ft^2
Meat processing[c]	10	15
Pharmacy	20	15
Photo studios	10	15

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 ton = 908 kg,

1 cubic foot per minute per square foot = 0.00508 $m^3/(s \bullet m^2)$,

°C = [(°F) -32]/1.8, 1 square foot = 0.0929 m^2.

a. Based upon net floor area.

b. Mechanical exhaust required and the recirculation of air from such spaces as permitted by Section 403.2.1 is prohibited (see Section 403.2.1).

c. Spaces unheated or maintained below 50°F are not covered by these requirements unless the occupancy is continuous.

d. Ventilation systems in enclosed parking garages shall comply with Section 404. A mechanical ventilation system shall not be required in garages having a floor area not exceeding 850 square feet and used for the storage of not more than four vehicles or trucks of 1 ton maximum capacity.

e. Where the ventilation rate is expressed in cfm/ft^2, such rate is based upon cubic feet per minute per square foot of the floor area being ventilated.

f. The sum of the outdoor and transfer air from adjacent spaces shall be sufficient to provide an exhaust rate of not less than 1.5 cfm/ft^2.

g. Transfer air permitted in accordance with Section 403.2.2.

Section 19. A new subsection 403.4 is added to the Seattle Mechanical Code, 2003 Edition, as follows:

403.4 Alternate Systems. Alternate systems designed in accordance with ASHRAE Standard 62-2001 shall be permitted. Calculations and documentation shall be included with the mechanical permit application.

Section 20. Subsections 404.1 and 404.2 of the International Mechanical Code, 2003 Edition, are amended as follows:

[E]404.1 Enclosed parking garage((s)) exhaust ventilation systems. ((~~Mechanical ventilation systems for enclosed parking garages are not required to operate continuously where the system is arranged to operate automatically upon detection of a concentration of carbon monoxide of 25 parts per million (ppm) by approved automatic detection devices.~~)) Enclosed parking garage exhaust ventilation systems with a total design capacity greater than 30,000 cfm shall include the equipment specified in items 1 and 2 below. Smaller exhaust systems shall include the equipment specified in either item 1 or 2.

1. An automatic control that is capable of staging fans or modulating fan speed as required to maintain carbon monoxide (CO) concentration below a level of 50 parts per million (ppm). This provision only applies to garages used predominantly by gasoline-powered vehicles.

2. An automatic control that is capable of shutting off fans or reducing fan speed during periods when the garage is not in use. The system shall be equipped with at least one of the following:

   a. An automatic time clock that can start and stop the system under different schedules for seven different day-types per week, is capable of retaining programming and time setting during loss of power for a period of at least 10 hours, and includes an accessible manual override that allows temporary operation of the system for up to 2 hours.

   b. An occupant sensor.

404.1.1 Ventilation makeup air. Ventilation makeup air shall be mechanically supplied to levels of enclosed parking garages more than 3 stories above or below the nearest garage entrance or exit.

404.2 Minimum ventilation. Unless otherwise allowed by Section 404.1, ((~~A~~)) automatic operation of the exhaust system shall not reduce the ventilation rate below 0.05 cfm per square foot (0.00025 $m^3/s \bullet m^2$) of the garage floor area and the system shall be capable of producing a ventilation rate of 1.0 cfm per square foot (0.00508 $m^3/s \bullet m^2$) of garage floor area, and, where applicable, 1.5 cfm per square foot (0.0076 $m^3/s \bullet m^2$) of loading dock floor area. Where enclosed parking garages and loading docks are combined on the same floor, the 1.5 cfm per square foot (0.0076 $m^3/s \bullet m^2$) of floor area ventilation rate shall apply to both areas of that floor.

Code Alternate CA 404.2: A garage ventilation system shall be designed to exhaust a minimum of 14,000 cfm for each operating vehicle. Such system shall be based on the anticipated instantaneous movement rate of vehicles but not less than 2.5% or one vehicle of the garage capacity.

Section 21. A new subsection 404.4 is added to the Seattle Mechanical Code, 2003 Edition, as follows:

404.4 Enclosed parking garage exhaust termination point. The termination point or exhaust outlet for garage exhaust ducts discharging to the atmosphere shall be located using the following minimum distances: 10 feet from a property line, 10 feet from operable openings into

a building and 10 feet from a mechanical air intake. Exhaust outlets which extend to the roof shall extend 3 feet (914 mm) above the roof.

Interpretation: For purposes of this section, property line shall include any property line separating one lot from another lot, but shall not include any property line separating a lot from a public street or alley right-of-way.

Interpretation: In certain land use zones, the Seattle Land Use Code requires that the venting of odors, vapors, smoke, cinders, dust, gas and fumes shall be at least 10 feet (3048 mm) above finished sidewalk grade, and directed away as much as possible from residential uses within 50 feet (15,240 mm) of the vent. This requirement has been interpreted to apply to garage exhaust system terminations.

Section 22. Subsection 405.1 of the International Mechanical Code, 2003 Edition, is amended as follows:

405.1 General. Mechanical ventilation systems shall be provided with manual or automatic controls that will operate such systems whenever the spaces are occupied. Air-conditioning systems that supply required ventilation air shall be provided with controls designed to automatically maintain the required outdoor air supply rate during occupancy. Additional mechanical system control requirements are contained in the *Washington State Energy Code with Seattle Amendments*.

Section 23. Section 406 of the International Mechanical Code, 2003 Edition, is amended as follows:

SECTION 406

VENTILATION OF ((~~UNINHABITED SPACES~~)) CRAWL SPACES AND ATTICS

406.1 General. ((~~Uninhabited spaces, such as c~~)) Crawl spaces and attics((~~,~~)) shall be provided with natural ventilation openings as required by the *International Building Code* or shall be provided with a mechanical exhaust and supply air system. The mechanical exhaust rate shall be not less than 0.02 cfm per square foot (0.00001 $m^3/s \bullet m^2$) of horizontal area and shall be automatically controlled to operate when the relative humidity in the space served exceeds 60 percent.

Section 24. A new subsection 501.5 is added to the International Mechanical Code, 2003 Edition, as follows:

501.5 Termination Point/Exhaust outlet. The termination point or exhaust outlet for exhaust ducts discharging to the atmosphere shall be located with the following minimum distances:

1. **For ducts conveying explosive or flammable vapors, fumes or dusts:** 30 feet (9144 mm) from the property line; 10 feet (3048 mm) from operable openings into the building; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm) from combustible walls and operable openings into the building which are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.

Interpretation: Item 1 includes carpentry shop exhaust, industrial chemical lab, paint shop and sandblasting exhaust systems.

2. **For other product-conveying outlets:** 10 feet (3048 mm) from the property line; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from operable openings into the building; 10 feet (3048 mm) above adjoining grade.

Interpretation: Item 2 includes central vacuum systems, dry cleaner, photo lab, school chemical lab and combustion engine exhaust.

3. **For environmental air duct exhaust:** 3 feet (914 mm) from the property line; 3 feet (914 mm) from operable openings into the building for all occupancies other than Group U, and 10 feet (3048 mm) from a mechanical air intake. This includes environmental air regulated by Sections 504 and 505. For enclosed parking garage exhaust, see Section 404.

Interpretation: For purposes of this section, property line shall include any property line separating one lot from another lot, but shall not include any property line separating a lot from a public street or alley right-of-way.

Note: In certain land use zones, the Seattle Land Use Code requires that the venting of odors, vapors, smoke, cinders, dust, gas and fumes shall be at least 10 feet (3048 mm) above finished sidewalk grade, and directed away as much as possible from residential uses within 50 feet (15,240 mm) of the vent.

Section 25. Subsection 502.1 of the International Mechanical Code, 2003 Edition, is amended as follows:

502.1 General. An exhaust system shall be provided, maintained and operated as specifically required by this section and for all occupied areas where machines, vats, tanks, furnaces, forges, salamanders and other appliances, equipment and processes in such areas produce or throw off dust or particles sufficiently light to float in the air, or which emit heat, odors, fumes, spray, gas or smoke, in such quantities so as to be irritating or injurious to health or safety.

502.1.1 Exhaust <u>inlet</u> location. The inlet to an exhaust system shall be located in the area of heaviest concentration of contaminants.

[F] 502.1.2 Fuel-dispensing areas. The bottom of an air inlet or exhaust opening in fuel-dispensing areas shall be located not more than 18 inches (457 mm) above the floor.

502.1.3 Equipment, appliance and service rooms. Equipment, appliance and system service rooms that house sources of odors, fumes, noxious gases, smoke, steam, dust, spray or other contaminants shall be designed and constructed so as to prevent spreading of such contaminants to other occupied parts of the building.

[F] 502.1.4 Hazardous exhaust. The mechanical exhaust of high concentrations of dust or hazardous vapors shall conform to the requirements of Section 510.

Section 26. Subsection 502.5 of the International Mechanical Code, 2003 Edition, is amended as follows:

[F]502.5 Valve-regulated lead-acid batteries. Valve-regulated lead-acid battery systems as regulated by Section 609 of the *International Fire Code*, shall be provided with ventilation in

accordance with Section 502.5.1 or 502.5.2 for rooms and in accordance with Section 502.5.3 or 502.5.4 for cabinets.

[F]502.5.1 Hydrogen limit in rooms. The ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the room during the worst-case event of simultaneous boost charging of all batteries in the room. Where calculations are not provided to substantiate the ventilation rate, continuous ventilation shall be provided in accordance with Section 502.5.2.

[F]502.5.2 Ventilation rate in rooms. Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot (cfm/ft.^{2}) [0.00508 $m^3/(s \cdot m^2)$] of floor area of the room.

[F] 502.5.3 Hydrogen limit in cabinets. Where VLA batteries are installed inside a cabinet, the cabinet shall be vented. The cabinet ventilation ~~system~~ shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the cabinet during the worst-case event of simultaneous boost charging of all batteries in the cabinet. Where calculations are not provided to substantiate the ventilation rate, continuous ventilation in accordance with Section 502.5.4 shall be provided.

[F]502.5.4 Ventilation rate in cabinets. Continuous ventilation of the cabinet shall be provided at a rate of not less than 1 cubic foot per minute per square foot (cfm/ft.^{2}) [0.00508 $m^3/(s \cdot m^2)$] of the floor area covered by the cabinet. The room in which the cabinet is installed shall also be ventilated as required by Section 502.5.1 or 502.5.2.

Section 27. Subsections 502.7 and 502.8 of the International Mechanical Code, 2003 Edition, are amended as follows:

[F] 502.7 Application of flammable finishes. Mechanical exhaust as required by this section shall be provided for operations involving the application of flammable finishes.

Spray finishing operations conducted in Group A, E, I or R Occupancies shall be located in a spray room separated vertically and horizontally from other areas in accordance with the *International Building Code*. In other occupancies, spray-finishing operations shall be conducted in a spray room, spray booth or limited spraying area approved for such use.

[F] 502.7.1 During construction. Ventilation shall be provided for operations involving the application of materials containing flammable solvents in the course of construction, alteration or demolition of a structure.

[F] 502.7.2 Limited spraying ((~~spaces~~)) areas. Positive mechanical ventilation which provides a minimum of six complete air changes per hour shall be installed in limited spraying ((~~spaces~~)) areas. Such system shall meet the requirements of the *International Fire Code* for handling flammable vapors. Explosion venting is not required.

[F] 502.7.3 Spraying areas. Mechanical ventilation of spraying areas shall be provided in accordance with Sections 502.7.3.1 through 502.7.3.7.

[F] 502.7.3.1 Operation. Mechanical ventilation shall be kept in operation at all times while spraying operations are being conducted and for a sufficient time thereafter to allow vapors from drying coated articles and finishing material residue to be exhausted.

Spraying equipment shall be interlocked with the ventilation of the spraying area such that spraying operations cannot be conducted unless the ventilation system is in operation.

[F] 502.7.3.2 Recirculation. Air exhausted from spraying operations shall not be recirculated.

Exceptions:

1. Air exhausted from spraying operations shall be permitted to be recirculated as makeup air for unmanned spray operations provided that:

    1.1. Solid particulate has been removed.

    1.2. The vapor concentration is less than 25 percent of the lower flammability limit (LFL).

    1.3. Approved equipment is used to monitor the vapor concentration.

    1.4. An alarm is sounded and spray operations are automatically shut down if the vapor concentration exceeds 25 percent of the LFL.

    1.5. The spray booths, spray ((~~spaces~~)) areas or spray rooms involved in any recirculation process shall be provided with mechanical ventilation that shall automatically exhaust 100 percent of the

required air volume in the event of shutdown by approved equipment used to monitor vapor concentrations.

2. Air exhausted from spraying operations shall be permitted to be recirculated as makeup air to manned spraying operations if all of the conditions provided in Exception 1 are included in the installation and documents have been prepared to show that the installation does not present life safety hazards to personnel inside the spray booth, spray ((~~space~~)) <u>area</u> or spray room.

[F] 502.7.3.3 Air velocity. Ventilation systems shall be designed, installed and maintained such that the average air velocity over the open face of the booth, or booth cross section in the direction of airflow during spraying operations, is not less than 100 feet per minute (0.51 m/s).

[F] 502.7.3.4 Ventilation obstruction. Articles being sprayed shall be positioned in a manner that does not obstruct collection of overspray.

[F] 502.7.3.5 Independent ducts. Each spray booth and spray room shall have an independent exhaust duct system discharging to the outdoors.

Exceptions:

1. Multiple spray booths having a combined frontal area of 18 square feet (1.67 m^2) or less are allowed to have a common exhaust where identical spray-finishing material is used in each booth. If more than one fan serves one

booth, such fans shall be interconnected so that all fans operate simultaneously.

2. Where treatment of exhaust is necessary for air pollution control or energy conservation, ducts shall be allowed to be manifolded if all of the following conditions are met:

2.1. The sprayed materials used are compatible and will not react or cause ignition of the residue in the ducts.

2.2. Nitrocellulose-based finishing material shall not be used.

2.3. A filtering system shall be provided to reduce the amount of overspray carried into the duct manifold.

2.4. Automatic sprinkler protection shall be provided at the junction of each booth exhaust with the manifold, in addition to the protection required by this chapter.

[F] 502.7.3.6 Termination point. ((~~The termination point for exhaust ducts discharging to the atmosphere shall be located with the following minimum distances.~~

~~1. For ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from the property line; 10 feet (3048 mm) from openings into the building; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm)~~

~~from combustible walls and openings into the building which are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.~~

~~2. For other product-conveying outlets: 10 feet (3048 mm) from the property line; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from openings into the building; 10 feet (3048 mm) above adjoining grade.~~

~~3. For environmental air duct exhaust: 3 feet (914 mm) from the property line; 3 feet (914 mm) from openings into the building.~~)) See Section 501.5.

[F] 502.7.3.7 Fan motors and belts. Electric motors driving exhaust fans shall not be placed inside booths or ducts. Fan rotating elements shall be nonferrous or nonsparking or the casing shall consist of, or be lined with, such material. Belts shall not enter the duct or booth unless the belt and pulley within the duct are tightly enclosed.

[F] 502.7.4 Dipping operations. Vapor areas of dip tank operations shall be provided with mechanical ventilation adequate to prevent the dangerous accumulation of vapors. Required ventilation systems shall be so arranged that the failure of any ventilating fan will automatically stop the dipping conveyor system.

[F] 502.7.5 Electrostatic apparatus. The spraying area in spray-finishing operations involving electrostatic apparatus and devices shall be ventilated in accordance with Section 502.7.3.

[F] 502.7.6 Powder coating. Exhaust ventilation for powder-coating operations shall be sufficient to maintain the atmosphere below one-half of the minimum explosive concentration for the material being applied. Nondeposited, air-suspended powders shall be removed through exhaust ducts to the powder recovery cyclone or receptacle.

[F] 502.7.7 Floor resurfacing operations. To prevent the accumulation of flammable vapors during floor resurfacing operations, mechanical ventilation at a minimum rate of 1 cfm/ft^2 [0.00508 m^3/(s • m^2)] of area being finished shall be provided. Such exhaust shall be by approved temporary or portable means. Vapors shall be exhausted to the exterior of the building.

[F] 502.8 Hazardous materials—general requirements. Exhaust ventilation systems for structures containing hazardous materials shall be provided as required in Sections 502.8.1 through 502.8.5.

[F] 502.8.1 Storage in excess of the maximum allowable quantities. Indoor storage areas and storage buildings for hazardous materials in amounts exceeding the maximum allowable quantity per control area shall be provided with mechanical exhaust ventilation or natural ventilation where natural ventilation can be shown to be acceptable for the materials as stored.

Exception: Storage areas for flammable solids complying with the *International Fire Code*.

502.8.1.1 System requirements. Exhaust ventilation systems shall comply with all of the following:

1. The installation shall be in accordance with this code.

2. Mechanical ventilation shall be provided at a rate of not less than 1 cfm/ft^2 [0.00508 $m^3/(s \cdot m^2)$] of floor area over the storage area.

3. The systems shall operate continuously unless alternate designs are approved.

4. A manual shutoff control shall be provided outside of the room in a position adjacent to the access door to the room or in another approved location. The switch shall be of ((~~the~~)) a break-glass type or other approved type and shall be labeled: VENTILATION SYSTEM EMERGENCY SHUTOFF.

5. The exhaust ventilation system shall be designed to consider the density of the potential fumes or vapors released. For fumes or vapors that are heavier than air, exhaust shall be taken from a point within 12 inches (304 mm) of the floor. For fumes or vapors that are lighter than air, exhaust shall be taken from a point within 12 inches (305 mm) of the highest point of the room.

6. The location of both the exhaust and inlet air openings shall be designed to provide air movement across all portions of the floor or room to prevent the accumulation of vapors.

7. The exhaust ((~~ventilation~~)) air shall not be recirculated within the room or building if the materials stored are capable of emitting hazardous vapors.

Section 28. Subsection 504.6 of the International Mechanical Code, 2003 Edition, is amended as follows:

504.6 Domestic clothes dryer ducts. Exhaust ducts for domestic clothes dryers shall be constructed of metal and shall have a smooth interior finish. The exhaust duct shall be a minimum nominal size of 4 inches (102 mm) in diameter. The entire exhaust system shall be supported and secured in place. The male end of the duct at overlapped duct joints shall extend in the direction of airflow. Clothes dryer transition ducts used to connect the appliance to the exhaust duct system shall be limited to single lengths not to exceed 8 feet (2438 mm) and shall be listed and labeled for the application. Transition ducts shall not be concealed within construction.

504.6.1 Maximum length. The maximum length of a clothes dryer exhaust duct shall not exceed 25 ft (7620 mm) from the dryer location to the outlet terminal. The maximum length of duct shall be reduced 2½ feet for each 45-degree (0.79 rad) bend and 5 feet (1524 mm) for each 90-degree (1.6 rad) bend. The maximum length of the exhaust duct does not include the transition duct.

Exception: Where the make and model of the clothes dryer to be installed is known and the manufacturer's installation instructions for such dryer are provided to the code official, the maximum length of the exhaust duct, including any transition duct, shall be permitted to be in accordance with the dryer manufacturer's installation instructions.

504.6.2 Rough-in required. Where a compartment or space for a domestic clothes dryer is provided, an exhaust duct system shall be installed in accordance with Sections 504.6 and 504.6.1.

504.6.3 Protection required. Clothes dryer exhaust ducts shall be protected by a steel plate or clip not less than 1/16 inch (1.59 mm) in thickness and of sufficient width to fully protect the duct. Plates or clips shall be placed on the finish face of all framing members which the clothes dryer exhaust duct passes through when there is less than 1¼ inch (32 mm) of framing material between the duct and the finish face. Plates or clips shall also be placed where nails or screws from finish or other work are likely to penetrate the clothes dryer exhaust duct.

Section 29 Subsection 505.1 of the International Mechanical Code, 2003 Edition, is amended as follows:

505.1 Domestic systems. Where domestic range hoods and domestic appliances equipped with downdraft exhaust are located within dwelling units, such hoods and appliances shall discharge to the outdoors through ducts constructed of galvanized steel, stainless steel, aluminum or copper. Such ducts shall have smooth inner walls and shall be air tight and equipped with a backdraft damper.

Domestic kitchen exhaust systems shall be exhausted separately from domestic clothes dryer and bathroom vent systems.

Exceptions:

1. Where installed in accordance with the manufacturer's installation instructions and where mechanical or natural ventilation is otherwise provided in accordance with Chapter 4, listed and labeled ductless range hoods shall not be required to discharge to the outdoors.

Note: Chapter 3 of the *Washington State Ventilation and Indoor Air Quality Code* requires either 100 cfm of intermittent or 25 cfm of continuous source specific kitchen exhaust ventilation.

2. Ducts for domestic kitchen cooking appliances equipped with downdraft exhaust systems shall be permitted to be constructed of Schedule 40 PVC pipe provided that the installation complies with all of the following:

   2.1. The duct shall be installed under a concrete slab poured on grade.

   2.2. The underfloor trench in which the duct is installed shall be completely backfilled with sand or gravel.

   2.3. The PVC duct shall extend not greater than 1 inch (25 mm) above the indoor concrete floor surface.

   2.4. The PVC duct shall extend not greater than 1 inch (25 mm) above grade outside of the building.

2.5. The PVC ducts shall be solvent cemented.

Section 30. Subsections 506.3 and 506.4 of the International Mechanical Code, 2003 Edition, are amended as follows:

506.3 Ducts serving Type I hoods. Type I exhaust ducts shall be independent of all other exhaust systems except as provided in Section 506.3.5. Commercial kitchen duct systems serving Type I hoods shall be designed, constructed and installed in accordance with Sections 506.3.1 through 506.3.12.3.

506.3.1 Duct materials. Ducts serving Type I hoods shall be constructed of materials in accordance with Sections 506.3.1.1 and 506.3.1.2.

506.3.1.1 Grease duct materials. Grease ducts serving Type I hoods shall be constructed of steel not less than 0.055 inch (1.4 mm) (No. 16 Gage) in thickness or stainless steel not less than 0.044 inch (1.1 mm) (No. 18 Gage) in thickness.

Exception: Listed and labeled factory-built commercial kitchen grease ducts shall be installed in accordance with Section 304.1.

506.3.1.2 Makeup air ducts. Make up air ducts connecting to or within 18 inches (457 mm) of a Type I hood shall be constructed and installed in accordance with Sections 603.1, 603.3, 603.4, 603.9, 603.10 and 603.12. Duct insulation installed within 18 inches (457 mm) of a Type I hood shall be noncombustible or shall be listed for the application.

506.3.2 Joints, seams and penetrations of grease ducts. Joints, seams and penetrations of grease ducts shall be made with a continuous liquid-tight weld or braze made on the external surface of the duct system.

Exceptions:

1. Penetrations shall not be required to be welded or brazed where sealed by devices that are listed for the application.

2. Internal welding or brazing shall not be prohibited provided that the joint is formed or ground smooth and is provided with ready access for inspection.

3. Listed and labeled factory-built commercial kitchen grease ducts installed in accordance with Section 304.1.

506.3.2.1 Duct joint types. Duct joints shall be butt joints or overlapping duct joints of either the telescoping or bell type. Overlapping joints shall be installed to prevent ledges and obstructions from collecting grease or interfering with gravity drainage to the intended collection point. The difference between the inside cross-sectional dimensions of overlapping sections of duct shall not exceed 0.25 inch (6 mm). The length of overlap for overlapping duct joints shall not exceed 2 inches (51 mm).

506.3.2.2 Duct-to-hood joints. Duct-to-hood joints shall be made with continuous internal or external liquid-tight welded or brazed joints. Such joints shall be smooth, accessible for inspection, and without grease traps.

Exceptions: This section shall not apply to:

1. A vertical duct-to-hood collar connection made in the top plane of the hood in accordance with all of the following:

    1.1. The hood duct opening shall have a 1-inch-deep (25 mm), full perimeter, welded flange turned down into the hood interior at an angle of 90 degrees from the plane of the opening.

    1.2. The duct shall have a 1-inch-deep (25 mm) flange made by a 1-inch by 1-inch (25 mm by 25 mm) angle iron welded to the full perimeter of the duct not less than 1 inch (25 mm) above the bottom end of the duct.

    1.3. A gasket rated for use at not less than 1,500°F (815°C) is installed between the duct flange and the top of the hood.

    1.4. The duct-to-hood joint shall be secured by stud bolts not less than 0.25 inch (6.4 mm) in diameter welded to the hood with a spacing not greater than 4 inches (102 mm) on center for the full perimeter of the opening. All bolts and nuts are to be secured with lockwashers.

2. Listed and labeled duct-to-hood collar connections installed in accordance with Section 304.1.

506.3.2.3 Duct-to-exhaust fan connections. Duct- to-exhaust fan connections shall be flanged and gasketed at the base of the fan for vertical discharge fans; shall be flanged, gasketed and bolted to the inlet of the fan for side-inlet utility fans; and shall be flanged, gasketed and bolted to the inlet and outlet of the fan for in-line fans.

506.3.2.4 Vibration isolation. A vibration isolation connector for connecting a duct to a fan shall consist of noncombustible packing in a metal sleeve joint of approved design or shall be a coated-fabric flexible duct connector listed and labeled for the application. Vibration isolation connectors shall be installed only at the connection of a duct to a fan inlet or outlet.

506.3.3 Grease duct supports. Grease duct bracing and supports shall be of noncombustible material securely attached to the structure and designed to carry gravity and seismic loads within the stress limitations of the *International Building Code*. Bolts, screws, rivets and other mechanical fasteners shall not penetrate duct walls.

506.3.4 Air velocity. Grease duct systems serving a Type I hood shall be designed and installed to provide an air velocity within the duct system of not less than 1,500 feet per minute (7.6 m/s).

Exception: The velocity limitations shall not apply within duct transitions utilized to connect ducts to differently sized or shaped openings in hoods and fans, provided that

such transitions do not exceed 3 feet (914 mm) in length and are designed to prevent the trapping of grease.

506.3.5 Separation of grease duct system. A separate grease duct system shall be provided for each Type I hood. A separate grease duct system is not required where all of the following conditions are met:

1. All interconnected hoods are located within the same story.

2. All interconnected hoods are located within the same room or in adjoining rooms.

3. Interconnecting ducts do not penetrate assemblies required to be fire-resistance rated.

4. The grease duct system does not serve solid fuel-fired appliances.

506.3.6 Grease duct clearances. Grease duct systems and exhaust equipment serving a Type I hood shall have a clearance to combustible construction of not less than 18 inches (457 mm), and shall have a clearance to noncombustible construction and gypsum wallboard attached to noncombustible structures of not less than 3 inches (76 mm).

Exception: Listed and labeled factory-built commercial kitchen grease ducts and exhaust equipment installed in accordance with Section 304.1.

506.3.7 Prevention of grease accumulation in grease ducts. Duct systems serving a Type I hood shall be constructed and installed so that grease cannot collect in any portion thereof,

and the system shall slope not less than one-fourth unit vertical in 12 units horizontal (2-percent slope) toward the hood or toward an approved grease reservoir. Where horizontal ducts exceed 75 feet (22 860 mm) in length, the slope shall not be less than one unit vertical in 12 units horizontal (8.3-percent slope).

506.3.8 Grease duct cleanouts and other openings. Grease duct systems shall not have openings therein other than those required for proper operation and maintenance of the system. Any portion of such system having sections not provided with access from the duct entry or discharge shall be provided with cleanout openings. Cleanout openings shall be equipped with tight-fitting doors constructed of steel having a thickness not less than that required for the duct. Doors shall be equipped with a substantial method of latching, sufficient to hold the door tightly closed. Doors shall be designed so that they are operable without the use of a tool. Door assemblies, including any frames and gasketing, shall be approved for the purpose, and shall not have fasteners that penetrate the duct. Listed and labeled access door assemblies shall be installed in accordance with the terms of the listing.

506.3.8.1 Personnel entry. Where ductwork is large enough to allow entry of personnel, not less than one approved or listed opening having dimensions not less than 20 inches by 20 inches (508 mm by 508 mm) shall be provided in the horizontal sections, and in the top of vertical risers. Where such entry is provided, the duct and its supports shall be capable of supporting the additional load and the cleanouts specified in Section 506.3.8 are not required.

506.3.9 Grease duct horizontal cleanouts. Cleanouts located on horizontal sections of ducts shall be spaced not more than 20 feet (6096 mm) apart. The cleanouts shall be located

on the side of the duct with the opening not less than 1.5 inches (38 mm) above the bottom of the duct, and not less than 1 inch (25 mm) below the top of the duct. The opening minimum dimensions shall be 12 inches (305 mm) on each side. Where the dimensions of the side of the duct prohibit the cleanout installation prescribed herein, the openings shall be on the top of the duct or the bottom of the duct. Where located on the top of the duct, the opening edges shall be a minimum of 1 inch (25 mm) from the edges of the duct. Where located in the bottom of the duct, cleanout openings shall be designed to provide internal damming around the opening, shall be provided with gasketing to preclude grease leakage, shall provide for drainage of grease down the duct around the dam, and shall be approved for the application. Where the dimensions of the sides, top or bottom of the duct preclude the installation of the prescribed minimum-size cleanout opening, the cleanout shall be located on the duct face that affords the largest opening dimension and shall be installed with the opening edges at the prescribed distances from the duct edges as previously set forth in this section.

506.3.10 Grease duct enclosure. A grease duct serving a Type I hood that penetrates a ceiling, wall or floor shall be enclosed from the point of penetration to the outlet terminal. A duct shall penetrate exterior walls only at locations where unprotected openings are permitted by the *International Building Code*. Ducts shall be enclosed in accordance with the *International Building Code* requirements for shaft construction. The duct enclosure shall be sealed around the duct at the point of penetration and vented to the outside of the building through the use of weather-protected openings. Clearance from the duct to the interior surface of enclosures of combustible construction shall be not less than 18 inches (457 mm). Clearance from the duct to the interior surface of enclosures of noncombustible construction or gypsum wallboard attached to noncombustible structures shall be not less

than ((~~6~~)) 3 inches (((~~152~~)) 76 mm). The duct enclosure shall serve a single grease exhaust duct system and shall not contain any other ducts, piping, wiring or systems.

Exceptions:

1. The shaft enclosure provisions of this section shall not be required where a duct penetration is protected with a through-penetration firestop system classified in accordance with ASTM E 814 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated and where the surface of the duct is continuously covered on all sides from the point at which the duct penetrates a ceiling, wall or floor to the outlet terminal with a classified and labeled material, system, method of construction or product specifically evaluated for such purpose, in accordance with a nationally recognized standard for such enclosure materials. Exposed duct wrap systems shall be protected where subject to physical damage.

((~~2. A duct enclosure shall not be required for a grease duct that penetrates only a nonfire-resistance-rated roof/ceiling assembly.~~))

506.3.11 Grease duct fire-resistive access opening. Where cleanout openings are located in ducts within a fire-resistance-rated enclosure, access openings shall be provided in the enclosure at each cleanout point. Access openings shall be equipped with tight-fitting sliding or hinged doors that are equal in fire-resistive protection to that of the shaft or enclosure. An approved sign shall be placed on access opening panels with wording as follows: "ACCESS PANEL. DO NOT OBSTRUCT."

506.3.12 Exhaust outlets serving Type I hoods. Exhaust outlets for grease ducts serving Type I hoods shall conform to the requirements of Sections 506.3.12.1 through 506.3.12.3.

506.3.12.1 Termination above the roof. Exhaust outlets that terminate above the roof shall have the discharge opening located not less than 40 inches (1016 mm) above the roof surface.

506.3.12.2 Termination through an exterior wall. Exhaust outlets shall be permitted to terminate through exterior walls where the smoke, grease, gases, vapors, and odors in the discharge from such terminations do not create a public nuisance or a fire hazard. Such terminations shall not be located where protected openings are required by the *International Building Code*. Other exterior openings shall not be located within ((~~3~~)) 10 feet (((~~914~~)) 3048 mm) of such terminations.

Note: See Director's Rule 14-98, or any rule superseding Director's Rule 14-98, for additional requirements.

506.3.12.3 Termination location. Exhaust outlets shall be located not less than 10 feet (3048 mm) horizontally from parts of the same or contiguous buildings, adjacent property lines and air intake openings into any building and shall be located not less than 10 feet (3048 mm) above the adjoining grade level.

Exception: Exhaust outlets shall terminate not less than 5 feet (1524 mm) from an adjacent building, adjacent property line and air intake openings into a building where air from the exhaust outlet discharges away from such locations.

Interpretation: For purposes of this section, property line shall include any property line separating one lot from another lot, but shall not include any property line separating a lot

506.4 Ducts serving Type II hoods. Single or combined Type II exhaust systems for food-processing operations shall be independent of all other exhaust systems. Commercial kitchen exhaust systems serving Type II hoods shall comply with Sections 506.4.1 and 506.4.2.

506.4.1 Type II exhaust outlets. Exhaust outlets for ducts serving Type II hoods shall comply with Sections 401.5 and 401.5.2. Such outlets shall be protected against local weather conditions and shall meet the provisions for exterior wall opening protectives in accordance with the *International Building Code*.

506.4.2 Ducts. Ducts and plenums serving Type II hoods shall be constructed of rigid metallic materials. Duct construction, installation, bracing and supports shall comply with Chapter 6. A duct serving a Type II hood that penetrates a fire-rated ceiling, floor or wall shall be enclosed in a duct enclosure from the point of penetration to the outlet terminal. Ducts subject to positive pressure and ducts conveying moisture-laden or waste-heat-laden air shall be constructed, joined and sealed in an approved manner.

Section 31. Subsection 507.2 of the International Mechanical Code, 2003 Edition, is amended as follows:

507.2 Where required. A Type I or Type II hood shall be installed at or above all commercial cooking appliances in accordance with Sections 507.2.1 and 507.2.2. Where any cooking appliance under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed.

507.2.1 Type I hoods. Type I hoods shall be installed ((~~where~~)) for collecting and removing grease and smoke generated from cooking appliances ((~~produce grease or smoke~~)), such as occurs with griddles, fryers, broilers, ovens, ranges and wok ranges.

507.2.2 Type II hoods. Type II hoods shall be installed ((~~where~~)) for collecting and removing steam, vapor, heat or odors from cooking or dishwashing appliances ((~~produce heat or steam and do not produce grease or smoke~~)), such as steamers, kettles, pasta cookers, pastry ovens, pizza ovens, coffee roaster ovens, roasting ovens of maximum 6 kW (20,000 Btu/h) capacity and dishwashing machines above 140°F (60°C) maximum water temperature.

Exceptions:

1. Under-counter-type commercial dishwashing machines.

2. A Type II hood is not required for dishwashers and potwashers that are provided with heat and water vapor exhaust systems that are supplied by the appliance manufacturer and are installed in accordance with the manufacturer's instructions.

507.2.3 Domestic cooking appliances used for commercial purposes. Domestic cooking appliances utilized for commercial purposes shall be provided with Type I or Type II hoods as required for the type of appliances and processes in accordance with Sections 507.2, 507.2.1 and 507.2.2.

507.2.4 Solid fuel. Type I hoods for use over solid fuel-burning cooking appliances shall discharge to an exhaust system that is independent of other exhaust systems.

Interpretation: The table below summarizes the types of hoods which are required for different types of appliances. The code official has determined that the appliances for which no hood is required do not produce amounts of steam, smoke, grease or heat comparable to the equipment listed in Section 507.2

TYPE OF APPLIANCE[1]	TYPE OF HOOD REQUIRED[2]		
	TYPE I	TYPE II	NONE
Baking oven		> 6 kW	≤ 6 kW
Charbroiler	All sizes		
Coffee maker		> 6 kW	≤ 6 kW
Coffee roaster		> 6 kW	≤ 6 kW
Deep-fat fryer	All sizes		
Dishwasher		> 140°F	≤ 140°F
Grill	All sizes		
Hot dog display heater		> 6 kW	≤ 6 kW
Microwave oven			All sizes
Pastry oven		> 6 kW	≤ 6 kW
Pizza oven		> 6 kW	≤ 6 kW
Popcorn maker		> 6 kW	≤ 6 kW
Roasting oven[3]	> 6 kW	≤ 6 kW	
Roll warmer		> 6 kW	≤ 6 kW
Solid-fuel burning appliances	All sizes & all food products		
Soup warmer, soup preparation cooking unit		> 6 kW	≤ 6 kW
Steam reconstitution device		> 6 kW	≤ 6 kW
Steam table		> 6 kW	≤ 6 kW
Steamer		> 6 kW	≤ 6 kW
Toaster		> 6 kW	≤ 6 kW

Warming oven	> 6 kW	≤ 6 kW

1. The code official shall determine hood requirements for appliances not listed in the table.
2. Section 507.2 defines Type I and Type II kitchen hoods.
3. Roasting ovens are used to cook raw or partially cooked food.

Section 32. Subsection 508.1 of the International Mechanical Code, 2003 Edition, is amended as follows:

508.1 Makeup air. Makeup air shall be supplied during the operation of commercial kitchen exhaust systems that are provided for commercial cooking appliances. The amount of makeup air supplied shall be approximately equal to the amount of exhaust air. The makeup air shall not reduce the effectiveness of the exhaust system. Makeup air diffusers shall be located to prevent a short-circuiting of makeup air furnished to the exhaust system. Makeup air shall be provided by gravity or mechanical means or both. For mechanical makeup air systems, the exhaust and makeup air systems shall be electrically interlocked to insure that makeup air is provided whenever the exhaust system is in operation. Makeup air intake opening locations shall comply with Sections 401.5 and 401.5.1. A separate makeup air system shall be provided for the kitchen that supplies not less than 90 percent of the air to be exhausted.

Exceptions:

1. Where total makeup air for a system is less than 400 cfm; or

2. Where hoods are used to exhaust ventilation air that would otherwise exfiltrate or be exhausted by other mechanical exhaust systems and there is a direct path for air to flow from an area supplied by ventilation air to the kitchen hood.

Exterior windows and doors shall not be used to provide commercial kitchen makeup air.

508.1.1 Makeup air temperature. The temperature differential between makeup air and the air in the conditioned space shall not exceed 10°F (6°C) <u>if the amount of makeup air supply exceeds 2,500 cfm (1180 L/s) per space</u>.

Exceptions:

1. Makeup air that is part of the air-conditioning system.

2. Makeup air that does not decrease the comfort conditions of the occupied space.

Section 33. Subsection 510.2 of the International Mechanical Code, 2003 Edition, is amended as follows:

510.2 Where required. A hazardous exhaust system shall be required wherever operations involving the handling or processing of hazardous materials, in the absence of such exhaust systems and under normal operating conditions, have the potential to create one of the following conditions:

1. A flammable vapor, gas, fume, mist or dust is present in concentrations exceeding 25 percent of the lower flammability limit of the substance for the expected room temperature.

2. A vapor, gas, fume, mist or dust with a health-hazard rating of 4 is present in any concentration.

3. A vapor, gas, fume, mist or dust with a health-hazard rating of 1, 2 or 3 is present in concentrations exceeding 1 percent of the median lethal concentration of the substance for acute inhalation toxicity.

Laboratories are permitted to comply with rules promulgated by the building official and fire official in lieu of this section.

[F] 510.2.1 Lumber yards and woodworking facilities. Equipment or machinery located inside buildings at lumber yards and woodworking facilities which generates or emits combustible dust shall be provided with an approved dust-collection and exhaust system installed in conformance with this section and the International Fire Code. Equipment and systems that are used to collect, process or convey combustible dusts shall be provided with an approved explosion-control system.

[F] 510.2.2 Combustible fibers. Equipment or machinery within a building which generates or emits combustible fibers shall be provided with an approved dust-collecting and exhaust system. Such systems shall comply with this code and the International Fire Code.

Section 34. Subsection 510.7 of the International Mechanical Code, 2003 Edition, is amended as follows:

510.7 Suppression required.

510.7.1 Ducts. Ducts shall be protected with an approved automatic fire suppression system installed in accordance with the International Building Code.

Exceptions:

1. An approved automatic fire suppression system shall not be required in ducts conveying materials, fumes, mists and vapors that are nonflammable and noncombustible under all conditions and at any concentrations.

2. An approved automatic fire suppression system shall not be required in ducts where the largest cross-sectional diameter of the duct is less than 10 inches (254 mm).

3. An approved automatic fire suppression system shall not be required in metallic ducts if all fume hoods served by the ducts are equipped with an approved fire suppression system.

510.7.2 Fume hoods. Approved automatic fire suppression shall be installed in fume hoods within which operations are conducted involving hazardous materials that have the potential to create a flammable vapor, gas, fume, mist or dust in concentrations exceeding 25 percent of the lower flammability limit of the substance or mixture for the expected room temperature in the absence of the fume hood and under normal operating conditions.

Section 34. Subsection 511.2 of the International Mechanical Code, 2003 Edition, is amended as follows:

511.2 Exhaust outlets. Outlets for exhaust that exceed 600°F (315°C) shall be designed as a chimney in accordance with Table 511.2.

The termination point for exhaust ducts discharging to the atmosphere shall not be less than ((~~the following:~~

~~1. Ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from property line; 10 feet (3048 mm) from openings into the building; 6 feet (1829 mm) from exterior walls or roofs; 30 feet (9144 mm) from combustible walls or openings into the building which are in the direction of the exhaust discharge; and 10 feet (3048 mm) above adjoining grade.~~

~~2. Other product-conveying outlets: 10 feet (3048 mm) from property line; 3 feet (914 mm) from exterior wall or roof; 10 feet (3048 mm) from openings into the building; and 10 feet (3048 mm) above adjoining grade.~~

~~3. Environmental air duct exhaust: 3 feet (914 mm) from property line; and 3 feet (914 mm) from openings into the building~~)) as required in Section 501.5.

Section 35. Subsection 513.2 of the International Mechanical Code, 2003 Edition, is amended as follows:

[B] 513.2 General design requirements. Buildings, structures, or parts thereof required by this code to have a smoke control system or systems shall have such systems designed in accordance with the applicable requirements of Section 909 of the *International Building Code* and the generally accepted and well-established principles of engineering relevant to the design. The construction documents shall include sufficient information and detail to describe adequately the elements of the design necessary for the proper implementation of the smoke control systems. These documents shall be accompanied with sufficient information and analysis to demonstrate compliance with these provisions.

See Seattle Building Code Section 909 for alternate design provisions.

Section 36. Subsections 513.11 and 513.12 of the International Mechanical Code, 2003 Edition, are amended as follows:

[B] 513.11 Power systems. The smoke control system shall be supplied with two sources of power. Primary power shall be the normal building power systems. Secondary power shall be from an approved standby source complying with the ((~~*ICC*~~)) *Seattle Electrical Code*. The standby power source and its transfer switches shall be in a separate room from the normal power transformers and switch gear and shall be enclosed in a room constructed of not less than 1-hour fire-resistance-rated fire barriers, ventilated directly to and from the exterior. Power distribution from the two sources shall be by independent routes. Transfer to full standby power shall be automatic and within 60 seconds of failure of the primary power. The systems shall comply with the ((~~*ICC*~~)) *Seattle Electrical Code*.

[B] 513.11.1 Power sources and power surges. Elements of the smoke management system relying on volatile memories or the like shall be supplied with uninterruptible power sources of sufficient duration to span 15-minute primary power interruption. Elements of the smoke management system susceptible to power surges shall be suitably protected by conditioners, suppressors or other approved means.

[B] 513.12 Detection and control systems. Fire detection systems providing control input or output signals to mechanical smoke control systems or elements thereof shall comply with the requirements of Chapter 9 of the *International Building Code* and NFPA 72. Such systems shall be equipped with a control unit complying with UL 864 and listed as smoke control equipment.

Control systems for mechanical smoke control systems shall include provisions for verification. Verification shall include positive confirmation of actuation, testing, manual override, the presence of power downstream of all disconnects and, through a preprogrammed weekly test sequence report, abnormal conditions audibly, visually and by printed report.

~~((~~**~~[B] 513.12.1 Wiring.~~** ~~In addition to meeting the requirements of the *ICC Electrical Code*, all wiring, regardless of voltage, shall be fully enclosed within continuous raceways.~~))

[F] 513.12.2 Activation. Smoke control systems shall be activated in accordance with the *International Building Code*.

[F] 513.12.3 Automatic control. Where completely automatic control is required or used, the automatic control sequences shall be initiated from an appropriately zoned automatic sprinkler system complying with Section 903.3.1.1 of the *International Fire Code* or from manual controls that are readily accessible to the fire department, and any smoke detectors required by engineering analysis.

Section 37. Subsection 514.1 of the International Mechanical Code, 2003 Edition, is amended as follows:

514.1 General. Energy recovery ventilation systems shall be installed in accordance with this section. Where required for purposes of energy conservation, energy recovery ventilation systems shall also comply with the ((~~*International Energy Conservation Code*~~)) <u>*Washington State Energy Code with Seattle Amendments*</u>.

Section 38. Subsections 601.2 and 601.3 of the International Mechanical Code, 2003 Edition, are amended as follows:

[B] 601.2 Air movement in egress elements. Exit access corridors shall not serve as supply, return, exhaust, relief or ventilation air ducts.

Exceptions:

1. Use of a corridor as a source of makeup air for exhaust systems in rooms that open directly onto such corridors, including toilet rooms, bathrooms, dressing rooms, smoking lounges and janitor closets, shall be permitted provided that each such corridor is directly supplied with ((~~outdoor~~)) air at a rate greater than the rate of makeup air taken from the corridor.

2. Where located within a dwelling unit, the use of corridors for conveying return air shall not be prohibited.

3. Where located within tenant spaces of 1,000 square feet (93 m^2) or less in area, utilization of corridors for conveying return air is permitted.

[W] 4. Where such air is part of an engineered smoke control system.

[W] 5. Corridors conforming to the *International Building Code* in Group I Occupancies.

[W] 6. Corridors serving residential occupancies shall be permitted to be supplied without specific mechanical exhaust subject to the following:

6.1 the supply air is one hundred percent outside air;

6.2 The units served by the corridor have conforming ventilation independent of the air supplied to the corridor, and

6.3 The duct penetration at the corridor walls shall be protected by approved fire and smoke dampers.

6.4 For other than high-rise buildings, the supply fan will automatically shut off upon activation of corridor smoke detectors. Such corridor smoke detectors shall be spaced at no more than 30 feet (9,144 mm) on center along the corridor, or

6.5 For high-rise buildings, corridor smoke detector activation will close required smoke/fire dampers at the supply inlet to the corridor at the floor receiving the alarm.

601.3 Contamination prevention. Exhaust ducts under positive pressure, chimneys, and vents shall not extend into or pass through ducts or plenums.

[W] **Exception:** Exhaust ducts conveying environmental air may pass through a duct or plenum provided that:

1. The duct is maintained under sufficient negative pressure to prevent leakage of the exhaust air to the surrounding duct or plenum; or

2. If maintained under a positive pressure with respect to the surrounding duct or plenum, the exhaust duct will be sealed to prevent leakage; or

3. The surrounding air stream is an exhaust air stream not intended for recirculation to the building and cross contamination of the two air streams will not create a hazardous condition.

Section 39. Subsection 602.2 of the International Mechanical Code, 2003 Edition, is amended as follows:

602.2 Construction. Plenum enclosures shall be constructed of materials permitted for the type of construction classification of the building.

The use of gypsum boards to form plenums shall be limited to systems where the air temperatures do not exceed 125°F (52°C) and the building and mechanical system design conditions are such that the gypsum board surface temperature will be maintained above the airstream dew-point temperature as determined by the design engineer. Air plenums formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers.

602.2.1 Materials exposed within plenums. Except as required by Sections 602.2.1.1 through 602.2.1.5, materials exposed within plenums shall be noncombustible or shall have

a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84.

Exceptions:

1. Rigid and flexible ducts and connectors shall conform to Section 603.
2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.
3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.
4. This section shall not apply to smoke detectors.
5. Combustible materials enclosed in approved gypsum board assemblies or enclosed in materials listed and labeled for such application.
6. Specialty drains and vents required for hazardous materials.

602.2.1.1 Wiring. Combustible electrical or electronic wiring methods and materials, optical fiber cable, and optical fiber raceway exposed within a plenum shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread not greater than 5 feet (1524 mm) when tested in accordance with NFPA 262. Only type OFNP (plenum rated nonconductive optical fiber cable) shall be installed in plenum-rated optical fiber raceways. Wiring, cable, and raceways addressed in this section shall be listed and labeled as plenum rated and shall be installed in accordance with ((~~*IGC*~~)) *Seattle Electrical Code*.

602.2.1.2 Fire sprinkler piping. Plastic fire sprinkler piping exposed within a plenum shall be used only in wet pipe systems and shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not

greater than 5 feet (1524 mm) when tested in accordance with UL 1887. Piping shall be listed and labeled.

602.2.1.3 Pneumatic tubing. Combustible pneumatic tubing exposed within a plenum shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1820. Combustible pneumatic tubing shall be listed and labeled.

602.2.1.4 Combustible electrical equipment. Combustible electrical equipment exposed within a plenum shall have a peak rate of heat release not greater than 100 kilowatts, a peak optical density not greater than 0.50 and an average optical density not greater than 0.15 when tested in accordance with UL 2043. Combustible electrical equipment shall be listed and labeled.

602.2.1.5 Foam plastic insulation. Foam plastic insulation used as wall or ceiling finish in plenums shall exhibit a flame spread index of 75 or less and a smoke developed index of 450 or less when tested in accordance with ASTM E 84 and shall also comply with Section 602.2.1.5.1, 602.2.1.5.2 or 602.2.1.5.3.

602.2.1.5.1 Separation required. The foam plastic insulation shall be separated from the plenum by a thermal barrier complying with Section 2603.4 of the *International Building Code*.

602.2.1.5.2 Approval. The foam plastic insulation shall be approved based on tests conducted in accordance with Section 2603.8 of the *International Building Code*.

602.2.1.5.3 Covering. The foam plastic insulation shall be covered by corrosion-resistant steel having a base metal thickness of not less than 0.0160 inch (0.4 mm).

Section 40. Subsection 603.5 of the International Mechanical Code, 2003 Edition, is amended as follows:

603.5 Nonmetallic ducts. Nonmetallic ducts shall be constructed with Class 0 or Class 1 duct material in accordance with UL 181. Fibrous duct construction shall conform to the SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Fibrous Glass Duct Construction Standards*. The maximum air temperature within nonmetallic ducts shall not exceed 250°F (121°C).

603.5.1 Gypsum ducts. The use of gypsum boards to form air shafts (ducts) shall be limited to return air systems where the air temperatures do not exceed 125°F (52°C) and the gypsum board surface temperature is maintained above the airstream dew-point temperature <u>as determined by the design engineer</u>. Air ducts formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers.

<u>Exceptions:</u>

<u>1. Gypsum boards coated on the inside with epoxy paint may be used for supply air ducts.</u>

<u>2. Foil-backed gypsum boards may be used for supply air ducts.</u>

3. Gypsum boards may be used for ducts that are used only for stairway or elevator pressurization air.

Section 41. Subsections 603.9 and 603.10 of the International Mechanical Code, 2003 Edition, are amended as follows:

603.9 Joints, seams and connections. All longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA HVAC *Duct Construction Standards—Metal and Flexible* and SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Fibrous Glass Duct Construction Standards*. All longitudinal and transverse joints, seams and connections shall be sealed in accordance with the ((~~*International Energy Conservation Code*~~)) *Washington State Energy Code with Seattle Amendments*.

603.10 Supports. Ducts shall be supported with approved hangers at intervals not exceeding 10 feet (3048 mm) or by other approved duct support systems designed in accordance with the *International Building Code*. Flexible and other factory-made ducts shall be supported in accordance with the manufacturer's installation instructions.

603.10.1 Seismic Bracing of Ducts. Longitudinal and transverse bracing shall be required for ducts 6 square feet (.56 m^2) and larger, including round ducts with a diameter of 34 inches (864 mm) or more, and on all duct systems used for life safety and smoke control installed in either the horizontal or vertical position.

603.10.1.1 Transverse Bracing. Transverse bracing shall occur at maximum intervals of 30 feet (9144 mm), at each duct turn and at the end of a duct run. Walls, including non-bearing fixed partitions, which have ducts running through them may replace a transverse brace.

603.10.1.2 Longitudinal Bracing. Longitudinal bracing shall occur at maximum intervals of 60 feet (18 288 mm). Transverse bracing for one duct section may also act as a longitudinal bracing for a duct section connected perpendicular to it, if bracing is installed within four feet (1219 mm) of the intersection and sized and installed on the larger duct.

603.10.2 Grouping of Ducts. Groups of ducts may be combined in a larger size frame using overall dimensions and maximum weight of ducts. At least 2 sides of each duct must be connected to the angles of the brace.

603.10.3 Seismic Loads. Bracing for ducts shall be designed to resist seismic loading, using accepted engineering practices and Chapter 16 of the Building Code.

Exception: No bracing is required if the duct is suspended by hangers 12 inches (305 mm) or less in length as measured from the top of the duct to the bottom of the support where the hanger is attached. Hangers must be positively attached to the duct within 2 inches (51 mm) of the top of the duct with a minimum of two #10 sheet metal screws.

Interpretation: Duct bracing that complies with the SMACNA guideline "Seismic Restraint Manual Guidelines for Mechanical Systems" shall be deemed to comply with Section 603.10.1.

Section 42. Subsections 603.14 and 603.15 of the International Mechanical Code, 2003 Edition, are amended as follows:

603.14 Location. Ducts shall not be installed in or within 4 inches (102 mm) of the earth, except where such ducts comply with Section ((~~603.7~~)) 603.8.

603.15 Mechanical protection. Ducts installed in locations where they are exposed to mechanical damage by vehicles or from other causes shall be protected by approved barriers. Ducts in pedestrian pathways in parking garages shall not interfere with the headroom requirements specified by the *International Building Code*.

Section 43. Subsection 604.1 of the International Mechanical Code, 2003 Edition, is amended as follows:

604.1 General. Duct insulation shall conform to the requirements of ((~~Sections 604.2 through 604.13 and the *International Energy Conservation Code*~~)) *the Washington State Energy Code with Seattle Amendments*.

Section 44. Subsection 606.2 of the International Mechanical Code, 2003 Edition, is amended as follows:

606.2 Where required. Smoke detectors shall be installed where indicated in Sections 606.2.1 through 606.2.3.

Exception: Smoke detectors shall not be required where air distribution systems are incapable of spreading smoke beyond the enclosing walls, floors and ceilings of the room or space in which the smoke is generated.

606.2.1 Return air systems. Smoke detectors shall be installed in return air systems with a design capacity greater than 2,000 cfm (0.9 m^3/s), in the return air duct or plenum upstream of any filters, exhaust air connections, outdoor air connections, or decontamination equipment and appliances.

Exception: Smoke detectors are not required in the return air system where all portions of the building served by the air distribution system are protected by area smoke detectors connected to a fire alarm system in accordance with the *International Fire Code*. The area smoke detection system shall comply with Section 606.4.

606.2.2 Common supply and return air systems. Where multiple air-handling systems share common supply or return air ducts or plenums with a combined design capacity greater than 2,000 cfm (0.9 m^3/s), the return air system shall be provided with smoke detectors in accordance with Section 606.2.1.

Exception: Individual smoke detectors shall not be required for each fan-powered terminal unit, provided that such units do not have an individual design capacity greater than 2,000 cfm (0.9 m^3/s) and will be shut down by activation of one of the following:

1. Smoke detectors required by Sections 606.2.1 and 606.2.3.

2. An approved area smoke detector system located in the return air plenum serving such units.

3. An area smoke detector system as prescribed in the exception to Section 606.2.1.

In all cases, the smoke detectors shall comply with Sections 606.4 and 606.4.1.

606.2.3 Return air risers. Where return air risers serve two or more stories and serve any portion of a return air system having a design capacity greater than 15,000 cfm (7.1 m^3/s), smoke detectors shall be installed at each story. Such smoke detectors shall be located upstream of the connection between the return air riser and any air ducts or plenums.

Interpretation: The fan-powered terminal units may be shut down by the building automation system upon activation of smoke detection described in Section 606.2.2 items 1, 2, or 3. The building automation system is not required to be listed as a smoke control system, nor comply with UL Standard 864 Standard for Control Units and Accessories for Fire Alarm Systems.

Section 45. Subsection 606.4 of the International Mechanical Code, 2003 Edition, is amended as follows:

606.4 Controls operation. Upon activation, the smoke detectors shall shut down the air distribution system. Air distribution systems that are part of a smoke control system shall switch to the smoke control mode upon activation of a detector.

606.4.1 Supervision. The duct smoke detectors shall be connected to the building's fire alarm control panel as a supervisory signal when a fire alarm system is provided. Duct detectors shall not activate a fire alarm signal. The actuation of a duct smoke detector shall activate a visible and audible supervisory signal at a constantly attended location.

Exceptions:

1. The supervisory signal at a constantly attended location is not required where the duct smoke detectors ((~~activates the building's alarm-indicating appliances~~)) are monitored by a central station alarm service.

2. In occupancies not required to be equipped with a fire alarm system, actuation of a smoke detector shall activate a visible and an audible signal in an approved location. Duct smoke detector trouble conditions shall activate a visible or audible signal in an approved location and shall be identified as air duct detector trouble.

Section 46. Subsection 801.1 of the International Mechanical Code, 2003 Edition, is amended as follows:

801.1 Scope. This chapter shall govern the installation, maintenance, repair and approval of factory-built chimneys, chimney liners, vents and connectors. This chapter shall also govern the utilization of masonry chimneys. Gas-fired appliances shall be vented in accordance with the *International Fuel Gas Code.* Hoistway venting requirements shall be in accordance with the *International Building Code.*

Section 47. Subsection 908.5 of the International Mechanical Code, 2003 Edition, is amended as follows:

908.5 Water supply. Water supplies and protection shall be as required by the ((~~*International*~~)) *Uniform Plumbing Code*.

Section 48. Subsection 1101.4 of the International Mechanical Code, 2003 Edition, is amended as follows:

1101.4 Water connection. Water supply and discharge connections associated with refrigeration systems shall be made in accordance with this code and the ((~~*International*~~)) *Uniform Plumbing Code*.

Section 49. Subsection 1105.3 of the International Mechanical Code, 2003 Edition, is amended as follows:

[F] 1105.3 Refrigerant detectors. Refrigerant detectors ((~~in machinery rooms~~)) shall be provided in rooms or spaces that contain quantites of refrigerant in excess of the quantities in IMC Table 1103.1 as ((~~required by the *International Fire Code*.~~)) follows.

[F] 1105.3.1 Within machinery rooms. Machinery rooms shall contain a refrigerant detector connected to an alarm system utilizing listed and approved fire alarm signaling devices capable of generating a sound level, distinctive from other alarm signals, of at least

15dB above the operating ambient sound pressure level of the space in which they are installed and initiating an approved distinctive visual alarm.

Where continuous mechanical ventilation is provided, failure of the ventilation system shall activate an audible and visual alarm.

The detector, or a sampling tube that draws air to the detector, shall be located in an area where refrigerant from a leak will concentrate.

The alarm shall be actuated at a value not greater than the corresponding TLV-TWA values shown in the *International Mechanical Code* for the refrigerant classification.

Exception: Machinery room vapor detectors for ammonia systems shall actuate an alarm at a detection level not to exceed 1,000 ppm and shall automatically exhaust air from the machinery room in accordance with the *International Mechanical Code* Section 1105.6.4 for emergency conditions.

Detectors and alarms shall be placed in approved locations.

[F] 1105.3.2 Outside of machinery rooms. Where evaporators and piping containing refrigerants are located within rooms or spaces used exclusively for processing or storage of materials under refrigerated conditions, the refrigerated room or space shall be equipped with a refrigerant-vapor detector and alarm system complying with Section 1105.3.1.

Activation of the refrigerant detector shall also automatically stop the flow of refrigerant to evaporators within the space and stop the flow of refrigerant in all supply lines leaving a machinery room whenever the refrigerant vapor concentration is detected at or above 50 percent of the IDLH or 25 percent of the LFL, whichever is lower.

Section 50. Subsections 1105.6 and 1105.7 of the International Mechanical Code, 2003 Edition, are amended as follows:

1105.6 Ventilation. Machinery rooms shall be continuously mechanically ventilated to the outdoors. Mechanical ventilation shall be capable of exhausting the minimum quantity of air both at normal operating and emergency conditions. Multiple fans or multispeed fans shall be allowed in order to produce the emergency ventilation rate and to obtain a reduced airflow for normal ventilation.

Interpretation: The requirement for continuous mechanical ventilation to the outdoors means that fire dampers are not allowed on machinery room ventilation ducts.

Exception: Where a refrigerating system is located outdoors more than 20 feet (6096 mm) from any building opening and is enclosed by a penthouse, lean-to or other open structure, natural or mechanical ventilation shall be provided. Location of the openings shall be based on the relative density of the refrigerant to air. The free-aperture cross section for the ventilation of the machinery room shall be not less than:

$$F = \sqrt{G} \qquad \textbf{(Equation 11-1)}$$

For SI :

$$F = 0.138\sqrt{G}$$

where:

F = The free opening area in square feet (m^2).

G = The mass of refrigerant in pounds (kg) in the largest system, any part of which is located in the machinery room.

1105.6.1 Discharge location. The discharge of the air shall be to the outdoors in accordance with Chapter 5. Exhaust from mechanical ventilation systems shall be discharged not less than 20 feet (6096 mm) from a property line or openings into buildings.

1105.6.2 Make-up air. Provisions shall be made for make-up air to be drawn from the outside to replace that being exhausted. Openings for make-up air shall be located to avoid intake of exhaust air. Supply and exhaust ducts to the machinery room shall serve no other area, shall be constructed in accordance with Chapter 5 and shall be covered with corrosion-resistant screen of not less than 1/4-inch (6.4 mm) mesh.

1105.6.3 Quantity—normal ventilation. ((~~During occupied conditions, t~~)) The mechanical ventilation system shall exhaust the larger of the following:

1. Not less than 0.5 cfm per square foot (0.0025 $m^3/s\ m^2$) of machinery room area or 20 cfm (0.009 m^3/s) per person; or

2. A volume required to limit the room temperature rise to 18°F (10°C) taking into account the ambient heating effect of all machinery in the room.

1105.6.4 Quantity—emergency conditions. Upon actuation of the refrigerant detector required in Section 1105.3, the mechanical ventilation system shall exhaust air from the machinery room in the following quantity:

$$Q = 100\sqrt{G} \qquad \textbf{(Equation 11-2)}$$

$$For\ SI: Q = 0.07\sqrt{G}$$

where:

Q = The airflow in cubic feet per minute (m^3/s).

G = The design mass of refrigerant in pounds (kg) in the largest system, any part of which is located in the machinery room.

[F] 1105.6.5 Standby source of power required. When treatment, detection, continuous ventilation or alarm systems are required, such systems shall be connected to a standby source of power to supply electrical power in the event of loss of power from the primary source. See the *International Fire Code* Section 606 and Chapter 27 and the *Seattle Electrical Code* Article 701.

1105.7 Termination of relief devices. Pressure relief devices, fusible plugs and purge systems located within the machinery room shall terminate outside of the structure at a location not less than 15 feet (4572 mm) above the adjoining grade level and not less than 20 feet (6096 mm) from any window, ventilation opening or exit.

For additional requirements regarding termination of relief devices for flammable refrigerants, toxic and highly toxic refrigerants, ammonia refrigerant, treatment systems, flaring systems, and ammonia diffusion systems, see Section 606.11 of the *International Fire Code*.

Section 51. Subsections 1106.3 and 1106.4 of the International Mechanical Code, 2003 Edition, are amended as follows:

1106.3 Ammonia room ventilation. Ventilation systems in ammonia machinery rooms shall be operated continuously at the normal ventilation rate determined by Section 1105.6.3.

Exception((~~s:~~

~~1. Machinery rooms equipped with a vapor detector that will automatically start the ventilation system and actuate an alarm at a detection level not to exceed 1,000 ppm ; or~~

~~2.~~)) Machinery rooms conforming to the Class 1, Division 2, hazardous location classification requirements of ((~~NFPA 70~~)) the *Seattle Electrical Code*.

1106.4 Flammable refrigerants. Where refrigerants of Groups A2, A3, B2 and B3 are used, the machinery room shall conform to the Class 1, Division 2, hazardous location classification requirements of ((~~NFPA 70~~)) the *Seattle Electrical Code*.

Exception: Ammonia machinery rooms, but not including ventilation fan motors.

Section 52. A new subsection 1106.7 is added to the Seattle Mechanical Code, 2003 Edition, as follows:

[F] 1106.7 Alarm activation. Where continuous ventilation is provided, failure of the ventilation system shall automatically activate an audible and visual alarm.

Section 53. Subsection 1107.4 of the International Mechanical Code, 2003 Edition, is amended as follows:

1107.4 Materials for refrigerant pipe and tubing. Piping materials shall be as set forth in Sections 1107.4.1 through 1107.4.5.

1107.4.1 Steel pipe. Carbon steel pipe with a wall thickness not less than Schedule 80 shall be used for Group A2, A3, B2 or B3 refrigerant liquid lines for sizes 1.5 inches (38 mm) and smaller. Carbon steel pipe with a wall thickness not less than Schedule 40 shall be used for Group A1 or B1 refrigerant liquid lines 6 inches (152 mm) and smaller, Group A2, A3, B2 or B3 refrigerant liquid lines sizes 2 inches (51 mm) through 6 inches (152 mm) and all refrigerant suction and discharge lines 6 inches (152 mm) and smaller. ((~~Type F steel pipe shall not be used for r~~)) Refrigerant lines having an operating temperature less than -20°F (-29°C) shall be designed to meet the requirements of ASME B31.5 - 2001, *Refrigeration Piping and Heat Transfer*.

1107.4.2 Copper and brass pipe. Standard iron-pipe size, copper and red brass (not less than 80-percent copper) pipe shall conform to ASTM B 42 and ASTM B 43.

1107.4.3 Copper tube. Copper tube used for refrigerant piping erected on the premises shall be seamless copper tube of Type ACR (hard or annealed) complying with ASTM B 280. Where approved, copper tube for refrigerant piping erected on the premises shall be seamless copper tube of Type K, L or M (drawn or annealed) in accordance with ASTM B 88. Annealed temper copper tube shall not be used in sizes larger than a 2-inch (51 mm) nominal size. Mechanical joints shall not be used on annealed temper copper tube in sizes larger than 7/8-inch (22.2 mm) OD size.

1107.4.4 Copper tubing joints. Copper tubing joints used in refrigerating systems containing Group A2, A3, B2 or B3 refrigerants shall be brazed. Soldered joints shall not be used in such refrigerating systems.

1107.4.5 Aluminum tube. Type 3003-0 aluminum tubing with high-pressure fittings shall not be used with methyl chloride and other refrigerants known to attack aluminum.

Section 54. Subsection 1107.7 of the International Mechanical Code, 2003 Edition, is amended as follows:

1107.7 Stop valves. All systems containing more than 6.6 pounds (3 kg) of a refrigerant in systems using positive-displacement compressors shall have stop valves installed as follows:

1. At the inlet of each compressor, compressor unit or condensing unit.

2. At the discharge outlet of each compressor, compressor unit or condensing unit and of each liquid receiver.

Exceptions:

1. Systems that have a refrigerant pumpout function capable of storing the entire refrigerant charge in a receiver or heat exchanger.

2. Systems that are equipped with provisions for pumpout of the refrigerant using either portable or permanently installed recovery equipment.

3. Self-contained systems.

1107.7.1 Liquid receivers. All systems containing 100 pounds (45 kg) or more of a refrigerant, other than systems utilizing nonpositive displacement compressors, shall have stop valves, in addition to those required by Section 1107.7, on each inlet of each liquid receiver. Stop valves shall not be required on the inlet of a receiver in a condensing unit, nor on the inlet of a receiver which is an integral part of the condenser.

Ammonia systems shall be provided with liquid receivers designed for pumpdown that have sufficient capacity to assure that the liquid does not occupy more than 90% of the volume of the receiver at 90°F.

1107.7.2 Copper tubing. Stop valves used with soft annealed copper tubing or hard-drawn copper tubing 7/8-inch (22.2 mm) OD standard size or smaller shall be securely mounted, independent of tubing fastenings or supports.

1107.7.3 Identification. Stop valves shall be identified where their intended purpose is not obvious. Numbers shall not be used to label the valves, unless a key to the numbers is located near the valves.

Section 55. Chapter 15 of the International Mechanical Code, 2003 Edition, is amended by adding the following referenced standard.

ASME B31.5 – 2001 Refrigeration Piping and Heat Transfer

Section 56. The Director of the Department of Planning and Development shall for a period of 60 days following the effective date of this ordinance, approve applications that comply with either the requirements of this Ordinance or with the provisions of Ordinance 119080 as amended by Ordinance 120380.

Section 57. This ordinance shall take effect and be in force thirty (30) days from and after its approval by the Mayor, but if not approved and returned by the Mayor within ten (10) days after presentation, it shall take effect as provided by Municipal Code Section 1.04.020.

Passed by the City Council the ____ day of _____, 2004, and signed by me in open session in authentication of its passage this _____ day of _____, 2004.

_____
President _____of the City Council

Approved by me this ____ day of _____, 2004.

_____
Gregory J. Nickels, Mayor

Filed by me this ____ day of _____, 2004.

_____
City Clerk

(Seal)